Series 1951, No. 5

Issued December 1958

SOIL SURVEY

Bolivar County Mississippi

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of Bolivar County will help you plan the kind of farming that will protect your soils and provide good yields. It describes the soils; shows their location on a map; and tells what they will do under different kinds of management.

Find Your Farm on the Map

In using this survey, start with the soil map, which consists of the sheets bound in the back of this report. These sheets, if laid together, make a large photographic map of the county as it looks from an airplane. You can see woods, fields, roads, rivers, and many other landmarks on this map.

To find your farm on the large map, use the index to map sheets. This is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located.

When you have found the map sheet for your farm, you will notice that boundaries of the soils have been outlined and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map.

Suppose you have found on your farm an area marked with the symbol Cc. You learn the name of the soil this symbol represents by looking at the map legend. The symbol Cc identifies Commerce silt loam.

Learn About the Soils on Your Farm

Commerce silt loam and all the other soils mapped are described in the section, Soil Types and Phases. Soil scientists, as they walked over the fields and through the woodlands, described and mapped the soils; dug holes and examined surface soils and subsoils; measured slopes with a hand level; noted differences in growth of crops, weeds, brush, or trees; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming.

After they mapped and studied the soils, the scientists talked with farmers and others about the use and management each soil should have, and then they placed it in a capability unit, or management group. A capability unit is a group of similar soils that need and respond to about the same kind of management. It shows the uses that can be made of the soil and the kind and amount of management needed to protect the soil and to obtain useful crops and other plants.

For example, Commerce silt loam is in capability class I. Turn to the section, Capability Groups of Soils, and read what is said about soils of capability class I. You will want to study table 6 which tells you how much you can expect to harvest from Commerce silt loam under two levels of management.

Make a Farm Plan

For the soils on your farm, compare your yields and farm practices with those given in this report. Look at your fields for signs of runoff and erosion. Then decide whether or not you need to change your methods. The choice, of course, must be yours. This survey will aid you in planning new methods, but it is not a plan of management for your farm or any other farm in the county.

If you find that you need help in farm planning, consult the local representative of the Soil Conservation Service or the county agricultural agent. Members of the staff of your State agricultural experiment station and others familiar with farming in your county will also be glad to help you.

Fieldwork for this survey was completed in 1951. Unless otherwise specifically indicated, all statements in this publication refer to conditions in Bolivar County at that time.

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SOIL SURVEY OF BOLIVAR COUNTY, MISSISSIPPI

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United States Department of Agriculture, Soil Conservation Service, in cooperation with the Mississippi Agricultual Experiment Station

General Nature of the Area

Agriculture is the principal industry in Bolivar County. Most of the farms are small. Cotton is the principal crop on most of them, but soybeans, rice, oats, and other field crops are also important.

Location and Extent

Bolivar County, the second largest county in the State, is in the northwestern part of Mississippi (fig. 1). It is bounded on the north by Coahoma County, on the east by Sunflower and Coahoma Counties, on the south by Washington County, and on the west by the Mississippi River. The county is about 41 miles long and 13 to 28 miles wide. Cleveland, the largest town and the county seat of the Second Judicial District, is about 105 miles northwest of Jackson, the State Capital, and 260 miles northwest of Biloxi. Rosedale is the county seat of the First Judicial District. The county has a land area of 917 square miles, or 586,880 acres, and a water area of 23 square miles, or 14,720 acres.

Physiography, Relief, and Drainage

The county lies entirely within the Mississippi Alluvial Plain (*2*),[2] also called the Mississippi River flood plain. Meanders, oxbow lakes, and crescent-shaped swamps are numerous throughout the area. Most of the stages that occur in the development of meander scrolls are represented in this county. Tributary streams and bayous of the Yazoo type cross the county from north to south.

Most of the county lies between 100 and 165 feet above sea level, the elevations becoming increasingly lower from north to south. The elevation at Alligator, in the northern part of the county, is 163 feet, and that at Shaw, in the southern part, is 130 feet. The elevation at Cleveland is 142 feet, and at Rosedale, which is near the Mississippi River, 143 feet. The gradient of the Mississippi River is less than one-tenth foot per mile.

Relief is typical of that in other parts of the Mississippi River flood plain. It ranges from level to sloping, but a large part is level or nearly level. Each of the small streams and bayous is fringed by its natural levee; many are bordered by escarpments 5 to 40 feet high. About

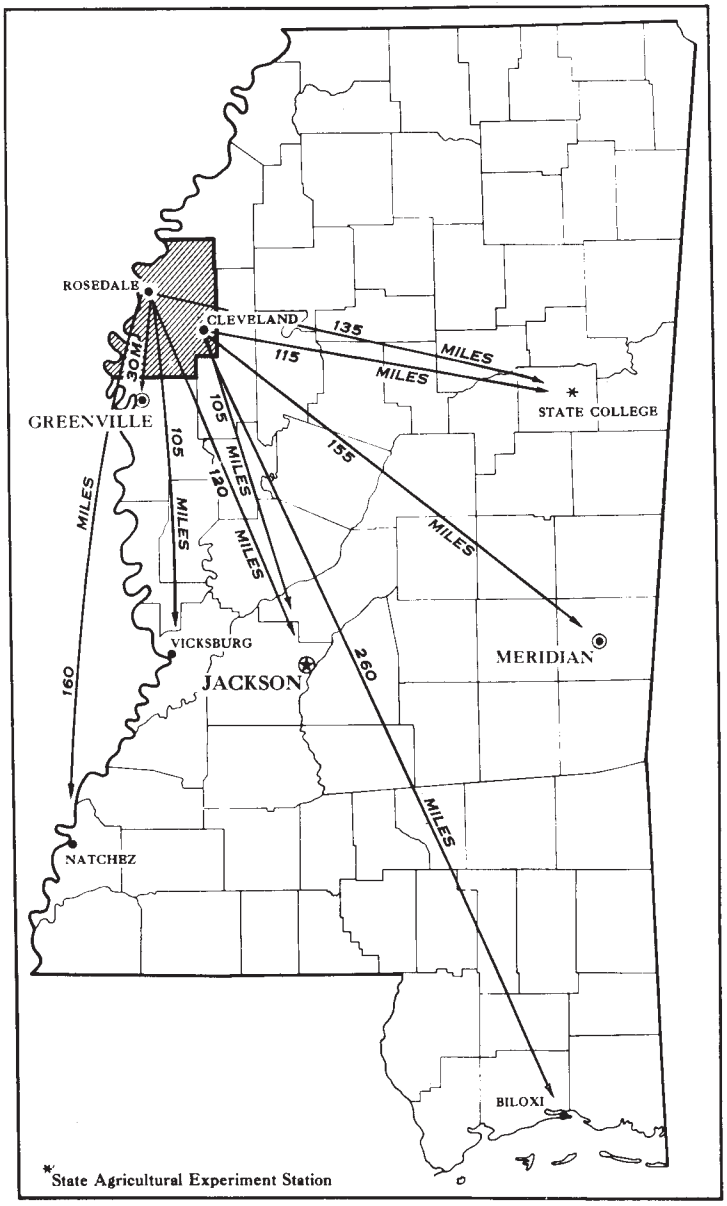

Figure 1.—Location of Bolivar County in Mississippi.

[1] Fieldwork for this survey was done when Soil Survey was part of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952. R. C. Jurney, Soil Survey, Soil Conservation Service, assisted in writing the report.

[2] Italic numbers in parentheses refer to Literature Cited, p. 42.

55 miles of the Mississippi River levee is within the boundaries of the county.

The old meanders of the Mississippi River and its tributaries determine much of the natural drainage pattern of the county. Canals and ditches of various sizes have been constructed to accelerate surface runoff, particularly in the level to nearly level backwater areas where sediments of clay and silty clay have been deposited by slow-moving floodwaters.

The Sunflower River flows for about 8 miles through the county. This river enters the county at a point about 4 miles east of Merigold and flows out of it at a point about 6 miles to the south. The Hushpuckena River enters the county at about the center of the northern boundary, flows south and east, and leaves the county at a point about 6 miles east of Shelby. The principal smaller streams are Jones Bayou, Bogue Phalia, Harris Bayou, Snake Creek, Porter Bayou, and Deer Creek.

Climate

The climate of Bolivar County is the humid continental type. The summers are rather hot; the winters are mild. Climate varies only a little throughout the county. In winter the temperature seldom drops below zero or climbs above 70° F. In summer, temperatures seldom rise above 100° F. or fall below 60°. The average frost-free period of 220 days extends from March 27 to November 2.

Table 1, compiled from the records of the United States Weather Bureau at Scott, Miss., gives the normal monthly, seasonal, and annual temperatures and precipitation.

The rainfall is fairly well distributed throughout the year. Normally there are no prolonged dry or wet periods. There are, however, occasional dry periods that last long enough in summer and fall to injure crops and pasture. At times wet periods last long enough to injure crops, particularly on the poorly drained soils. The heaviest precipitation comes in winter and spring, and local flooding by the smaller streams and bayous is not unusual.

Winter weather frequently occurs in the following cycle: A slow rain; clearing and colder; frost; increasing humidity and cloudiness; and rain again. A typical summer day is bright and sunny, with an occasional cloud in the sky, a fairly high temperature, and little change in temperature during the day. Thundershowers in the afternoon and evening are common. In fall and spring the days are pleasant and comfortable.

Except for a few days early in spring, strong winds are not common. Damaging tornadoes and hailstorms do occur but are not usual.

Vegetation

The county was originally covered by vegetation comprised largely of hardwoods and a dense undergrowth of vines and canes. Most of the trees were various species

TABLE 1.—*Normal temperature and precipitation at Scott, Bolivar County, Miss.*

[Elevation, 137 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1924)	Wettest year (1923)	Average snowfall
	° F.	° F.	° F.	*Inches*	*Inches*	*Inches*	*Inches*
December	47. 3	84	−1	5. 65	3. 74	9. 14	0. 8
January	44. 9	79	1	4. 35	4. 64	4. 03	. 3
February	48. 5	83	17	3. 99	4. 36	5. 43	. 4
Winter	46. 9	84	−1	13. 99	12. 74	18. 60	1. 5
March	55. 4	88	19	4. 65	4. 63	4. 43	. 4
April	63. 4	92	30	4. 83	4. 01	12. 72	0
May	71. 0	96	39	5. 12	5. 00	8. 14	0
Spring	63. 3	96	19	14. 60	13. 64	25. 29	. 4
June	79. 0	100	50	3. 18	. 77	2. 71	0
July	81. 4	108	53	3. 66	. 52	7. 75	0
August	81. 1	106	53	3. 09	. 54	2. 67	0
Summer	80. 5	108	50	9. 93	1. 83	13. 13	0
September	75. 8	105	40	2. 92	4. 02	3. 93	0
October	65. 1	95	29	2. 96	0	4. 30	0
November	52. 9	85	18	3. 96	. 70	4. 40	. 5
Fall	64. 6	105	18	9. 84	4. 72	12. 63	. 5
Year	63. 8	108	−1	48. 36	32. 93	69. 65	2. 4

[1] Average temperature based on a 38-year record, through 1955; highest and lowest temperatures on a 10-year record, through 1930.

[2] Average precipitation based on a 38-year record, through 1955; wettest and driest years based on a 37-year record, in the period 1918–55; snowfall based on a 10-year record, through 1930.

of oak, hickory, pecan, and gum. Many willows and cottonwoods grew near the Mississippi River. On the bottom lands were four fairly distinct types of hardwoods. These were—

1. Swamp hardwood type, mostly cypress and tupelo-gum.
2. Slough type, known as the overcup oak-bitter pecan type.
3. Cherry bark and cow oak-hickory type, which includes any or all the foregoing species, together with such species as post oak, blackgum, and winged-elm.
4. Water oak-gum type. This type is made up of gum or oak trees in varying proportions.

Most of the county has been cleared, and all the forest has been cut over. Between the Mississippi River and its levee, much of the land is in trees of various kinds. In most places there is a dense undergrowth of vines and canes. Small areas of timber are distributed throughout the county, mostly on poorly drained heavy soils.

Organization of the County

Little is known about the early history of Bolivar County. The Indians apparently lived in the areas of higher elevation where the better cropland is located. All of the Indian mounds in the county are near areas that are considered excellent cropland today. Apparently their chief crops were beans, pumpkins, melons, and corn.

Bolivar County was established in 1836. It was formed, by the Treaty of Dancing Rabbit Creek, from part of the Choctaw Indian Cession of 1830. It was named after Simon Bolivar, a South American patriot. The county is divided into two judicial districts. Rosedale is the county seat of the First Judicial District. Cleveland is the county seat of the Second Judicial District.

The date the first settlers arrived in the county is not known. Available records, however, show that there was a considerable influx of settlers between 1850 and 1860. In 1876 a large number of settlers came from the hill counties to the Yazoo Basin, and it is likely that many of them settled in Bolivar County.

Most of the early settlers made their homes on land adjacent to the Mississippi River. Later, settlement centered in the area now traversed by United States Highway No. 61. As recently as 1900, most of the people in the county lived in one of these two areas. The center of the county was still almost inaccessible because of lack of roads.

The development of Bolivar County was furthered by cotton. Cotton provided the cash for farms that were otherwise self-sustaining. The Yazoo and Mississippi Valley Railroad, which was completed in 1884, stimulated the growth of the county. More land was cleared, more cotton was planted, and the agricultural pattern was established.

Population

In 1950 Bolivar County had a population of 63,004. Of this population 6,747, or 10.7 percent, was urban, and 56,257, or 89.3 percent, was rural. The rural nonfarm population was 16,199, and the rural farm population was 40,058.

The county has no large towns. Cleveland, the largest town, had a population of 6,747 in 1950. The towns next in size are Rosedale, which had a population of 2,197 in 1950, and Shelby, which had a population of 2,148. Other smaller towns and trading centers are Merigold, Duncan, Alligator, Hushpuckena, Chambers, Renova, Round Lake, Mound Bayou, Perthshire, Boyle, Pace, Gunnison, Benoit, Shaw, Scott, Beulah, Deeson, Lobdell, Skene, Lamont, Malvina, and Symonds.

Transportation Facilities

Cleveland and Rosedale are located on lines of the Yazoo and Mississippi Valley Railroad (Illinois Central system). One line passes through the eastern part of the county, and one passes through the western part. Both lines are closely paralleled by paved highways. One paved highway, which runs from east to west, passes through Cleveland and Rosedale. Most of the roads in the county are graveled and are well maintained.

In 1950, 852 farms were located on hard-surface roads; 5,720 were on gravel, shell, or shale roads; and 2,257 were on dirt or unimproved roads.

In 1950, distance to the trading center visited most frequently was less than 1 mile for 948 farms; 1 to 4 miles for 5,089 farms; 5 to 9 miles for 2,434 farms; and 10 miles or more for 700 farms. In the same year the distance over dirt or unimproved road was 0 to 0.2 mile for 4,148 farms; 0.3 to 0.9 mile for 1,042 farms; 1.0 to 4.9 miles for 1,646 farms; and 5.0 miles or more for 181 farms.

Schools

Educational facilities include grammar and high schools. These are in various towns and at other points in the county. The Delta State Teachers College, located at Cleveland, provides facilities for higher education.

Agriculture

The agriculture of Bolivar County is based primarily on the growing of field crops. A small part of the farm income is derived from the sale of livestock and livestock products. On the following pages the more outstanding features of this agriculture are discussed. The statistics used are from reports published by the United States Bureau of the Census.

Land Use

In 1954, 77.5 percent of the county, or 454,562 acres, was in farms. The farmland classified by use in 1954 and the percentages of farmland used for the different purposes are as follows:

	Acres	*Percent*
Cropland (total)	358, 778	78. 9
Harvested	303, 444	66. 8
Used only for pasture	30, 617	6. 7
Not harvested or pastured	24, 717	5. 4
Woodland (total)	61, 629	13. 6
Pastured	21, 974	4. 9
Not pastured	39, 655	8. 7
Other land pastured	12, 903	2. 8
Land pastured (total)	65, 494	14. 4
Other land (house lots, roads, wasteland, and so on)	21, 252	4. 7

Types of Farms

In 1954, 291 farms in Bolivar County were miscellaneous and unclassified. The rest were listed by type of farm as follows:

	Number
Field-crop other than vegetable and fruit-and-nut	6, 482
Cash-grain	145
Cotton	6, 337
Dairy	17
Livestock other than dairy and poultry	24
General	19
Primarily crop	11
Crop and livestock	8

Crops

The acreage of all of the principal crops grown in Bolivar County has fluctuated considerably during the past few years. Table 2 shows the acreage of the principal crops and the number of fruit and nut trees and grapevines in the county for specified years.

TABLE 2.—*Acreage of the principal crops and number [1] of fruit and nut trees and grapevines of bearing age*

Crop	1939	1949	1954
	Acres	*Acres*	*Acres*
Cotton	160, 115	210, 583	137, 203
Corn for all purposes	87, 880	36, 129	19, 650
Small grains threshed or combined:			
Oats	14, 336	10, 894	25, 263
Rice	(2)	(2)	31, 685
Other grains	(2)	[3] 1, 879	14, 614
Soybeans:			
Grown alone	29, 430	33, 903	63, 069
Grown with other crops	6, 249	389	266
Hay:			
Alfalfa	17, 936	5, 570	1, 185
Lespedeza	714	12, 059	4, 743
Soybeans	(2)	10, 323	5, 297
Small grain	174	649	1, 149
Other	(2)	647	1, 595
Potatoes	220	[4] 22	[5] 15
Sweetpotatoes and yams	401	[4] 77	[5] 20
Vegetables harvested for sale [6]	33	105	150
	Number	*Number*	*Number* [7]
Apple trees	428	1, 284	599
Peach trees	6, 827	6, 125	2, 236
Pear trees	569	667	234
Cherry trees	16	17	5
Plum and prune trees	1, 012	1, 271	217
Fig trees	322	381	101
Pecan (cultivated and wild trees)	5, 985	6, 514	5, 788
Grapevines	449	189	94

[1] Numbers in census years 1940, 1950, and 1954, respectively.
[2] Figure not available.
[3] Includes rice threshed or combined.
[4] Does not include acres for farms with less than 15 bushels harvested.
[5] Does not include acres for farms with less than 20 bushels harvested.
[6] Exclusive of potatoes, sweetpotatoes, and yams.
[7] Does not include data for farms with less than 20 trees or grapevines.

Cotton is the principal cash crop, although the acreage has decreased considerably since 1949. In 1954, cotton was grown on about 45 percent of the harvested cropland as compared to nearly 67 percent in 1949. Many farmers have diverted the soils that are poorly suited to cotton to other uses. Some areas, once used to grow cotton, are now pastured, and some are used to grow soybeans, rice, and feed crops.

Soybeans are second to cotton in importance. In 1954 they were grown for beans on 21 percent of the harvested cropland and for hay on about 2 percent.

Rice, reported alone in 1954 for the first time, was grown on 31,685 acres, or on about 10.4 percent of the harvested cropland. Ninety-two farms reported rice, and the yield was 1,819,344 bushels.

Oats, threshed or combined, occupied about 8.3 percent of the harvested cropland. They were grown on 681 farms and yielded 1,045,740 bushels.

Corn is grown on a large acreage but is not so important as it was in former years. In 1954, it was grown on 2,571 farms and occupied about 6.5 percent of the harvested cropland. Part of the crop was sold for cash.

A total of 14,614 acres was used in 1954 to grow grains other than soybeans, rice, oats, and corn. These grains were threshed or combined, and the crops were mostly sold off the farm.

Of the hay crops reported in 1954, soybeans and lespedeza were grown on the largest acreages. Soybeans were grown for hay on about 2 percent of the harvested cropland, and lespedeza was grown on about 1.5 percent. Small grains were cut for hay on some farms, and alfalfa was grown on about 0.4 percent of the harvested cropland. Some farmers grow hay as a cash crop.

In 1954, 187 acres of lespedeza, or 200 acres less than was grown in 1954, was grown for seed. Crimson clover was grown for seed on only 8 acres, but 1,481 acres of other field seed crops was harvested.

Sweetpotatoes and yams were grown on many farms for home use or for sale. Irish potatoes were grown on a number of farms, but their acreage was not so large as that in sweetpotatoes and yams. Other vegetables were grown for home use on many of the farms, and 150 acres of vegetables was grown for sale.

Livestock and Livestock Products

On 41 farms in the county, a major source of income in 1954 was livestock or livestock products. The value of all livestock and livestock products sold, however, was only about 3.6 percent of the value of all farm products sold during that year. Table 3 gives the number of livestock on farms in the county for stated years.

TABLE 3.—*Livestock on farms*

Livestock	1940	1950	1954
	Number	*Number*	*Number*
Horses and colts, including ponies	[1] 1, 436	931	472
Mules and mule colts	[1] 12, 618	7, 203	1, 969
Cattle and calves	[1] 13, 765	16, 794	30, 338
Hogs and pigs	[2] 35, 600	24, 545	10, 775
Sheep and lambs	[3] 146	2, 763	2, 990
Chickens [2]	192, 013	134, 288	88, 698

[1] More than 3 months old.
[2] More than 4 months old.
[3] More than 6 months old.

In 1954, 10,212 head of cattle, including calves, were sold alive. Also sold were 3,816 hogs and pigs, 1,359 sheep and lambs, 85 horses and mules, and 11,245 chickens. Livestock products sold included 73,879 dozens of chicken eggs, 667,065 gallons of whole milk, and 6,471 pounds of butterfat.

Tenure and Size of Farms

In 1954, tenants operated about 81 percent of the farms. Owners operated about 12.6 percent, and part-owners and managers operated about 6.4 percent. Tenants operated a total of 131,791 acres, owners 122,192 acres, and part-owners and managers 200,579 acres.

The size of the average farm in Bolivar County in 1954 was 67.5 acres. This was an increase from that in 1950, when the average-sized farm was 52 acres. Many of the tenant-operated farms are only 10 acres in size. Some farms are large. In 1954, 126 farms had 500 to 999 acres, and 89 farms were 1,000 acres or more in size.

Labor Supply

In 1954, a large share of the farms, 6,464, reported expenditures for machine hire, hired labor, or both. In addition to 9,588 hired workers, there were 14,053 other operators or unpaid members of the operator's family who worked 1 or more hours.

Farm Improvements and Mechanical Equipment

In 1954, electricity was reported on 6,114 farms, and 777 farms had telephones. In the same year, 1,179 farms had piped running water, 894 had home freezers, and 507 had television sets. Milking machines were reported on 34 farms, 32 farms had electric pig brooders, and 102 farms had electric power feed grinders.

The number of work animals on farms has decreased greatly since 1940, and tractors have become more numerous. Mules are the principal work stock and are a little more than four times as numerous as horses.

In 1954, there were 4,021 tractors on 1,488 farms; 1,668 motortrucks on 1,285 farms; and 3,205 automobiles on 2,438 farms. There were 626 grain combines on 512 farms; 100 cornpickers on 93 farms; and 210 pickup hay balers on 200 farms.

The farms in 1954 classified according to work power are as follows: No tractor, horses, or mules, 4,912 farms; no tractor and only 1 horse or mule, 90 farms; no tractor and 2 or more horses, mules, or both, 358 farms; tractor and horses, mules, or both, 428 farms; and tractor and no horses or mules, 1,045 farms.

Forest Products

In 1954 little of the farm income in this county was derived from the sale of forest products. Firewood was cut on about 5.6 percent of the farms. Fence posts, saw logs, veneer logs, pulpwood, pilings, and poles were cut on some farms. A total of 26 farms reported sales of miscellaneous forest products.

How a Soil Survey Is Made

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils each boring or hole reveals several distinct layers, called *horizons*, which collectively are known as the soil *profile*. Each horizon is studied to see how it differs from others in the profile and to learn the things about this soil that influence its capacity to support plant growth.

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and it is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer and whether it is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in larger grains and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified into soil series, types, and phases.

As an example of soil classification, consider the Alligator series of Bolivar County. This series is made up of 3 soil types and 7 phases. Each phase is a kind of soil that is shown on the map by a symbol and is described in this report. The types and phases in the Alligator series in Bolivar County are:

Series	*Type*	*Phase*
Alligator	Clay	Nearly level phase.
		Level phase.
		Gently sloping phase.
	Silty clay	Nearly level phase.
		Level phase.
		Gently sloping phase.
	Silty clay loam	Nearly level phase.

Soil series.—In a soil series are two or more soil types that, except for the texture of the surface soil, have similar characteristics within the profile. All soils of the same series have developed from the same kind of parent material. Variations in slopes or in other features external to the soil profile are permitted so long as these variations do not affect the profile characteristics. Each series is named for the locality where the series was first recognized.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type. The texture of the surface soil determines the number of soil

types in a series. There may be one or more types in a series, because soil types are based on the texture of the surface soil. Thus, Commerce silt loam, Commerce silty clay loam, and Commerce silty clay are soil types within the Commerce series.

Soil phase.—Variations within the soil type, generally based on such external characteristics as relief, stoniness, accelerated erosion, or depth of surface soil, are designated as soil phases. Dubbs very fine sandy loam, nearly level phase, and Dubbs very fine sandy loam, gently sloping phase, are examples of phases in Bolivar County originating from differences in relief.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices therefore can be specified more easily than for a soil series or for broader groups that contain more variations.

Soil complex.—In a soil complex are two or more soils so intricately associated in small areas that it is not feasible to show them separately on the soil map. Dundee-Clack soils, nearly level phases, is a complex mapped in Bolivar County.

Soil variant.—A taxonomic unit closely related to another taxonomic unit, say a soil series, but having at least one differentiating characteristic at the series level. Variants are really separate soil series but of too small known extent to justify establishing a new series (*10*). Crevasse loamy sand, shallow variant, is a soil variant mapped in Bolivar County.

Miscellaneous land types.—These are areas of land that have little or no natural soil, that are too inaccessible for examination, or that for other reasons cannot feasibly be classified and mapped in detail. Alluvial soils is a miscellaneous land type mapped in Bolivar County.

Soils of Bolivar County

Most of the important differences among the soils of Bolivar County are related to differences in parent material, age, or drainage. All of the soils were derived from alluvium, most of which was deposited by the Mississippi River. Part of the alluvium, however, consisted of sediments deposited by waters of tributaries.

Most of the soils in the county have a clay, silty clay, silt loam, or silty clay loam texture. The texture of a few is very fine sandy loam, sandy loam, loamy sand, or fine sandy loam. The soils are predominantly nearly level to level.

Soil Series and Their Relations

The soils of the county have been placed in 19 series according to differences in their characteristics. So that their relationship can be better understood, the series are grouped in table 4 according to the kind of parent material from which they were derived. The two main groups are:

1. Soils developed from Mississippi River alluvium.
2. Soils developed from silty alluvium that originated in the loess hills.

Soils developed from Mississippi River alluvium

Most of the soils of Bolivar County have developed from Mississippi River alluvium. The alluvium was derived from many different sources, so the soils developed from this material vary greatly. They range in texture from loamy sand to clay and in reaction from alkaline to strongly acid.

Clack, Beulah, Bosket, Dubbs, Dundee, and Forestdale Series

The soils of the Clack, Beulah, Bosket, Dubbs, Dundee, and Forestdale series occupy old natural levees of the Mississippi River flood plain. These are generally older soils than the soils of the Commerce, Crevasse, Mhoon, and Robinsonville series on recent natural levees. They occupy higher positions that normally are above flood level. In most of them, the profile is fairly well developed.

The Clack soils, like the Crevasse, are very sandy. They have very rapid internal drainage, medium acid to strongly acid reaction, and very weak profile development. They are associated with the Beulah, Bosket, Dubbs, and Dundee soils.

The Beulah soil has a very fine sandy loam surface soil and a fine sandy loam subsoil. It is medium to slightly acid and is somewhat excessively drained. Its profile is weakly developed.

The Bosket soils have a finer textured subsoil than the Beulah soil. They are medium to slightly acid and are well drained. Moderate contrast is apparent between the horizons in their profiles, and some structural development is apparent in the subsoil.

The Dubbs soils have formed from moderately coarse textured to fine textured alluvium on old natural levees. In contrast to the Clack soils, which range from moderately coarse to coarse in texture, the Dubbs soils are medium in texture. They are strongly to slightly acid and are moderately well drained to well drained. Their profiles are moderately well developed.

The Dundee soils are medium to strongly acid. They have about the same kind of parent material as the Dubbs soils and are associated with them. They are distinguished from the Dubbs soils in being somewhat less well drained.

The Forestdale soils are medium to strongly acid. They are associated with the Dubbs and Dundee soils on old natural levees but, unlike those soils, are somewhat poorly drained to poorly drained. Their position is a little lower on the old natural levees than that of the Dubbs and Dundee soils, and their texture is generally finer.

Crevasse, Robinsonville, Commerce, and Mhoon Series

Soils of the Crevasse, Robinsonville, Commerce, and Mhoon series occupy recent natural levees on the flood plain of the Mississippi River. All of these soils are friable, have weak to very weak development, and are neutral to alkaline in reaction. Under natural conditions they are subject to inundation by the higher floods, but they now are protected by a system of levees.

TABLE 4.—*Soil series arranged by parent material, and principal characteristics of the series*

SOILS DEVELOPED FROM MISSISSIPPI RIVER ALLUVIUM

Series	Topographic position	Slope	Natural drainage	Description
		Percent		
Alligator	Slack-water flats	0–7	Poor	Dominantly light-gray surface soil; gray clay subsoil mottled with yellowish brown.
Beulah	Old natural levees	½–3	Somewhat excessive	Light brownish-gray surface soil; light yellowish-brown fine sandy loam subsoil.
Bosket	Old natural levees	½–7	Good	Light brownish-gray surface soil; dark-brown to brown sandy clay loam subsoil.
Clack	Old natural levees	½–3	Excessive	Grayish-brown surface soil; grayish-brown to light brownish-gray loamy sand subsurface layer.
Commerce	Recent natural levees	½–3	Moderately good to somewhat poor.	Grayish-brown, dark-brown to grayish-brown, or dark grayish-brown to light brownish-gray surface soil; light brownish-gray or grayish-brown to dark grayish-brown silt loam, silty clay, or silty clay loam subsurface layer; some mottling.
Crevasse	Recent natural levees	½–3	Excessive	Yellowish-brown surface soil; yellowish-brown loamy sand subsurface layer.
Dowling	Depressions or abandoned stream channels.	0–½	Poor	Dark-gray surface soil; gray clay subsoil faintly mottled with shades of brown.
Dubbs	Old natural levees	½–7	Moderately good to good.	Grayish-brown surface soil; subsoil of yellowish-brown silty clay loam grading to dark yellowish-brown fine sandy loam.
Dundee	Old natural levees	½–10	Somewhat poor to moderately good.	Light brownish-gray surface soil; light yellowish-brown silty clay subsoil; some mottling.
Forestdale	Old natural levees	½–7	Somewhat poor to poor	Light brownish-gray surface soil; grayish-brown silty clay subsoil mottled with shades of gray and brown.
Mhoon	Recent natural levees	½–3	Somewhat poor to poor	Pale-brown surface soil; light-gray silt loam subsoil mottled with shades of yellow and with other shades of gray.
Robinsonville	Recent natural levees	½–3	Good	Yellowish-brown surface soil; dark grayish-brown silt loam subsurface layer.
Sharkey	Slack-water flats	0–7	Poor	Very dark grayish-brown surface soil; very dark gray clay subsurface layer mottled with brown and with other shades of gray.
Souva	Depressions or abandoned stream channels.	0–½	Moderately good to somewhat poor.	Grayish-brown surface soil; gray silty clay loam subsoil mottled with shades of brown and yellow.
Tunica	Slack-water flats	½–7	Somewhat poor	Dark grayish-brown surface soil; dark-gray clay subsurface layer faintly mottled with brown and with other shades of gray.
Waverly	Depressions	0–½	Poor	Pale-brown to grayish-brown surface soil mottled with shades of yellow and with other shades of brown; light-gray to grayish-brown silty clay loam subsoil mottled with shades of yellow and brown.

SOILS DEVELOPED FROM SILTY ALLUVIUM ORIGINATING FROM LOESS HILLS

Brittain	Old natural levees	½–3	Somewhat poor	Dark grayish-brown surface soil; gray to grayish-brown silt loam subsoil mottled with shades of brown and yellow.
Dexter	Old natural levees	½–7	Good	Very pale brown surface soil; dark-brown to yellowish-brown silty clay loam subsoil.
Pearson	Old natural levees	½–7	Moderately good	Faintly mottled very pale brown surface soil in the upper part; yellowish brown, mottled with light gray, in the lower part. Yellowish-brown silt loam subsoil mottled with light gray; grades to dark yellowish-brown silty clay loam mottled with light grayish brown.

The Crevasse soils occupy the natural levees on the highest strips of the flood plain. They lie next to the present channel or next to old abandoned river channels. They are very sandy and are excessively drained.

The Robinsonville soil is well drained. Its texture is predominantly fine sandy loam. In general, this soil lies just off the highest part of the recent natural levees. It is among the most desirable soils of the county for cultivated crops.

The Commerce soils are moderately well drained to somewhat poorly drained. On the recent natural levees they generally are at a little lower elevation than the

Robinsonville soil, and their texture is finer. In a large acreage of these soils, the texture is predominantly silt loam throughout the profile.

The Mhoon soil is somewhat poorly drained to poorly drained. Of all the soils in this group, it occupies the lowest position on the recent natural levees. Its texture is predominantly silt loam.

Tunica, Sharkey, and Alligator Series

The soils of the Tunica, Sharkey, and Alligator series occur on the slack-water flats of the Mississippi River flood plain. These slack-water flats are broad, nearly level to gently sloping areas some distance from the present channel or from abandoned channels. In these parts of the flood plain, the floodwaters moved slowly and deposited only fine sediments, principally clay. The soils on these flats occur at lower elevations than the soils of the Crevasse, Robinsonville, Commerce, and Mhoon series. They have weakly developed profiles.

The Tunica soils are somewhat poorly drained. They are somewhat darker colored than the Alligator soils. They are slightly acid to neutral in reaction.

The Sharkey soils are poorly drained. They are medium acid to neutral in reaction. These soils are darker in color throughout than the Alligator soils. They are also less acid and show somewhat more contrast between profile horizons.

The Alligator soils are closely associated with the Tunica and Sharkey soils. They have light-gray surface soils and mottled gray subsoils. They are poorly drained and are medium to strongly acid.

Souva, Dowling, and Waverly Series

Soils of the Souva, Dowling, and Waverly series occur in depressions or in old stream channels on the Mississippi River flood plain. These are the lowest lying soils of the county. They are subject to flooding by local runoff, even though they may be protected by the levees. Most of the material from which these soils originated is local alluvium washed from adjacent areas of other soils. All of these soils have weak profile development. Their subsoils are mottled.

The Souva soils are moderately well drained to somewhat poorly drained. They are medium acid to neutral. These soils generally have a surface soil of silty clay loam.

The Dowling soils are poorly drained and are slightly acid to neutral. The texture of their surface soils is predominantly clay.

The Waverly soil is poorly drained. It is medium to strongly acid. Its surface soil is mottled silt loam.

Soils developed from silty alluvium originating from loess hills

The tributary sediments in Bolivar County are all on old natural levees. They consist of silty material that originated from the loess hills about 25 miles to the east. This material was transported and deposited by local tributary streams. This silty alluvium has formed the soils of the Dexter, Pearson, and Brittain series.

The Dexter soils are well drained and are medium acid to slightly acid. They have strong profile development.

The Pearson soils are moderately well drained. They are strongly acid to slightly acid and have medium profile development. Their surface soils and subsoils are mottled.

The Brittain soil is somewhat poorly drained. It is medium acid to slightly acid and has moderate profile development. Its subsoil is mottled.

Miscellaneous land types

In addition to the soils of the 19 series, Alluvial soils, a miscellaneous land type, was mapped in this county. This land type consists mainly of soils of the Commerce and Robinsonville series, but to some extent it is made up of soils of the Mhoon and Crevasse series.

Soil Associations

Soil associations are groups of two or more soil series that appear in a recurring geographic pattern. The five associations of Bolivar County are shown in figure 2.

Soil association maps are useful in appraising the soil resources of large areas, as the planner must consider the proportion of the various soils and the pattern in which they are distributed. Soil association maps cannot be used as a basis for farm planning because they are too generalized.

1. Alluvial soils

The Alluvial soils association lies between the Mississippi River and the main levee. The areas are frequently flooded. Most of this association is forested. Except in the cleared and cultivated areas, the soils were not mapped in detail. The soils that were mapped are chiefly members of the Commerce and Robinsonville series. The less extensive soils are members of the Mhoon and Crevasse series.

2. Commerce-Robinsonville-Crevasse

The Commerce-Robinsonville-Crevasse association occurs along the eastern side of the Mississippi River levee. The principal soils are the Commerce, Robinsonville, Crevasse, and Mhoon, all of which are on recent natural levees. The Dowling and Souva, less extensive soils, are in depressions or the channels of former streams.

In general the relief is nearly level, but some small areas are gently sloping. The soils are neutral to alkaline. All of the principal soils are easily worked.

The principal soils are in capability classes I, II, and IV. They are among the most productive in the county. The levee protects them from overflow. A large part of the association is used for row crops. The principal crops are cotton, soybeans, and corn, but a small acreage is used for small grains and pasture.

3. Forestdale-Dundee-Bosket

The principal areas of the Forestdale-Dundee-Bosket association occupy a rather broad belt that extends from the northwestern part of the county across to the eastern boundary and then southward to the southern boundary.

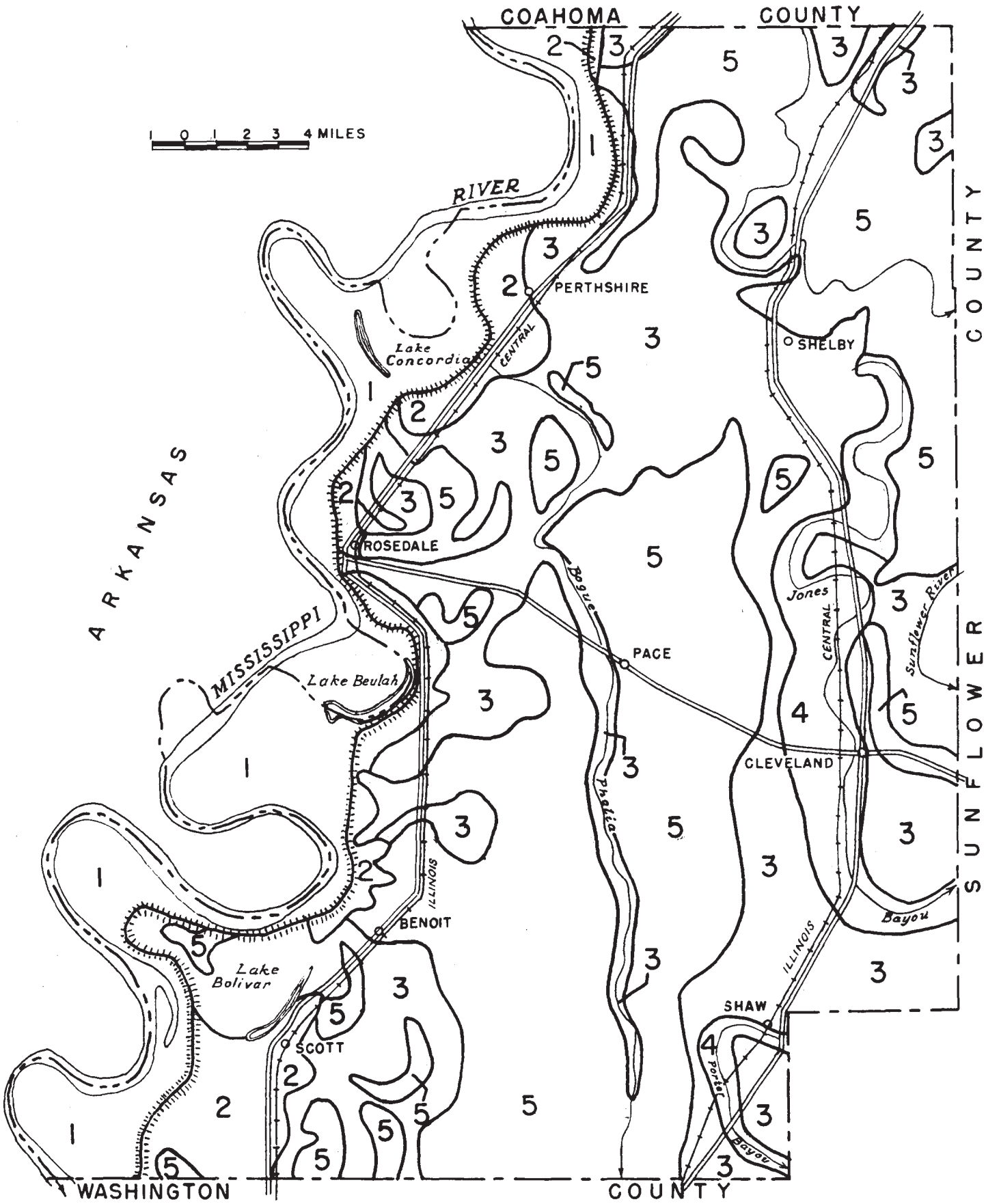

Figure 2.—Soil associations in Bolivar County: 1. Alluvial soils; 2. Commerce-Robinsonville-Crevasse; 3. Forestdale-Dundee-Bosket; 4. Brittain-Pearson-Dexter; 5. Dowling-Alligator-Sharkey.

Its western side is fringed by the Commerce-Robinsonville-Crevasse association. A narrow band extends along each side of Bogue Phalia in the central part of the county.

This association consists of soils developed on old natural levees and in depressions or channels of former streams. The principal series are the Forestdale, Dundee, Dubbs, Bosket, Beulah, and Clack, all on old natural levees. The Dowling and Souva soils occupy depressions or channels of former streams and occur as narrow strips within large areas on the old natural levees.

In general, the relief is nearly level, but a few narrow strips have slopes of 7 to 10 percent. The soils are strongly acid to slightly acid. Their drainage ranges from poor to excessive. All are fairly easy to work and are easy to manage.

The soils are in capability classes I, II, III, and IV. They are among the most productive soils in the county. Cotton is the principal crop. Some parts of the association are used for soybeans, corn, small grains, hay, and pasture. Only a small part is in forest.

4. Brittain-Pearson-Dexter

The Brittain-Pearson-Dexter association occupies a narrow belt next to Jones and Porter Bayous in the southeastern and eastern parts of the county. This association consists of soils developed on old natural levees and in depressions. The principal series are the Brittain, Pearson, and Dexter on old natural levees and the Waverly in depressions. The Waverly soil occupies long narrow, strips within larger areas of the other soils.

The soils of this association have developed from silty alluvium. Their silt content is higher than that of the soils of any of the other associations in the county. Their surface soils are prevailingly silt loam, and their subsoils are silt loam to silty clay loam. The relief is predominantly nearly level to gently sloping. A small part of the association is level, and there are occasional narrow, strongly sloping strips. The reaction of the soils ranges from strongly to slightly acid.

All the soils are easily worked. They belong to capability classes I and II. Most of the association is used for crops, principally cotton, soybeans, and corn. The rest is used for small grains, hay, and pasture. The soils are well suited to truck crops, but these are grown on only small acreages. No forested areas are in this association, but some small woodlots are next to the bayous.

5. Dowling-Alligator-Sharkey

The principal areas of the Dowling-Alligator-Sharkey association occupy a broad belt that extends from the northeastern part of the county down to the south-central part. The principal soils are the Dowling, in depressions or former stream channels, and the Alligator, Sharkey, and Tunica, on slack-water flats. The Tunica soils occupy the smallest part of the association.

The relief is nearly level to gently sloping on most of the association. Some areas are level, however, and occasional narrow strips have strong slopes. The reaction ranges from strongly acid to neutral. The Alligator soils are the most acid.

The soils are difficult to work. Most of them have fine-textured clayey surface soils and subsoils. They are mostly in capability classes III and IV, but some of them are in capability class II.

Most of this association is used for crops. Cotton is grown on the larger part of the soils. But, because cotton yields have been decreasing, some of the acreage formerly used to grow cotton is now used for soybeans, rice, hay, and pasture. This association has a larger proportion in forest than the other associations. The forests consist of bottom-land hardwoods of various kinds. In some areas they occupy several square miles.

Soil Types and Phases

The soils of Bolivar County are described in detail in the following pages, and their use and suitability for agriculture are discussed. Some technical terms were used to make the soil descriptions concise and exact. Definitions of these terms have been given in the glossary, p.40. The approximate acreage and proportionate extent of the soils are given in table 5. Their location and distribution are shown on the soil map at the back of this report.

Alligator clay, nearly level phase (½ to 3 percent slopes) (Ab).—This is a fine-textured, poorly drained soil formed from Mississippi River alluvium. Locally it is called yellow buckshot. It is closely associated with Sharkey clay, nearly level phase. This soil is lighter colored, is slightly more acid, and has less structural development than the associated Sharkey soil. It occurs on the slack-water flats in the eastern part of the county. Its total acreage is the largest of the Alligator soils. The native vegetation was various species of bottom-land hardwoods.

Profile description:

Surface soil (plow layer)
0 to 6 inches, light brownish-gray firm clay; plastic when wet, and very hard when dry; weak fine to medium granular structure.

Subsoil
6 to 24 inches, gray firm to very firm clay mottled with yellowish brown; very plastic when wet, and very hard when dry; structureless (massive).

Underlying material
24 to 36 inches, light-gray firm to very firm clay mottled with various shades of gray, brown, and yellow; structureless (massive).

This soil is medium to strongly acid and has a moderate supply of organic matter. Its permeability to roots, moisture, and air is slow.

Use and suitability (unit IIIs–2 [3]).—The main crops are cotton, soybeans, and corn, but some of the soil is used for oats, rice, and pasture, to which it is well suited. It is also well suited to soybeans and hay crops.

Because the soil is heavy clay, it is hard to work. The problem of water control is difficult. There are only comparatively brief periods when the soil is not too wet or too dry for tillage.

Alligator clay, level phase (0 to ½ percent slopes) (Aa).—This soil differs from Alligator clay, nearly level phase, chiefly in having level relief and a light-gray plow layer. It occurs in small areas on the slack-water flats in the eastern part of the county. The soil has slow permeability, is medium to strongly acid, and has a moderate quantity of organic matter.

[3] Number indicates capability group to which mapping unit belongs.

TABLE 5.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Alligator clay:		
Nearly level phase	28, 593	5. 0
Level phase	810	. 1
Gently sloping phase	1, 042	. 2
Alligator silty clay:		
Nearly level phase	7, 104	1. 2
Level phase	227	(1)
Gently sloping phase	337	. 1
Alligator silty clay loam, nearly level phase	1, 311	. 2
Alluvial soils	56, 033	9. 5
Beulah very fine sandy loam, nearly level phase	1, 527	. 3
Bosket very fine sandy loam:		
Nearly level phase	4, 456	. 8
Gently sloping phase	124	(1)
Brittain silt loam, nearly level phase	14, 840	2. 5
Clack loamy sand, nearly level phase	788	. 1
Clack sandy loam, nearly level phase	394	. 1
Commerce silt loam	8, 290	1. 4
Commerce silty clay loam	5, 126	. 9
Commerce silty clay	1, 451	. 4
Commerce-Robinsonville-Crevasse soils	1, 053	. 2
Crevasse loamy sand	3, 224	. 5
Crevasse loamy sand, shallow variant	893	. 1
Dexter silt loam:		
Nearly level phase	1, 307	. 2
Gently sloping phase	413	. 1
Dowling clay	80, 563	14. 0
Dowling soils, overwash phases	23, 698	4. 0
Dubbs very fine sandy loam:		
Nearly level phase	5, 087	. 9
Gently sloping phase	492	. 1
Dundee silt loam:		
Nearly level phase	11, 487	1. 9
Gently sloping phase	2, 337	. 4
Dundee silty clay, nearly level phase	7, 854	1. 3
Dundee silty clay loam:		
Nearly level phase	29, 769	5. 0
Gently sloping phase	1, 527	. 3
Sloping phase	55	(1)
Dundee very fine sandy loam:		
Nearly level phase	11, 487	2. 0
Gently sloping phase	1, 189	. 2
Dundee-Clack soils:		
Nearly level phases	2, 251	0. 4
Gently sloping phases	1, 665	. 3
Forestdale silt loam:		
Nearly level phase	21, 052	3. 6
Gently sloping phase	90	(1)
Forestdale silty clay loam:		
Nearly level phase	27, 136	4. 6
Gently sloping phase	555	. 1
Forestdale silty clay:		
Nearly level phase	3, 198	. 5
Gently sloping phase	445	. 1
Forestdale soils, nearly level phases	1, 244	. 2
Mhoon silt loam	223	(1)
Pearson silt loam:		
Nearly level phase	3, 985	. 7
Gently sloping phase	1, 121	. 2
Robinsonville fine sandy loam	1, 194	. 2
Sharkey clay:		
Nearly level phase	106, 490	18. 1
Level phase	10, 619	1. 8
Gently sloping phase	604	. 1
Sharkey silty clay:		
Nearly level phase	47, 893	8. 1
Level phase	484	. 1
Gently sloping phase	490	. 1
Sharkey silty clay loam, nearly level overwash phase	1, 545	. 3
Sharkey very fine sandy loam, nearly level overwash phase	824	. 1
Sharkey-Clack soils:		
Nearly level phases	3, 242	. 6
Gently sloping phases	847	. 1
Souva soils	1, 163	. 2
Tunica silty clay:		
Nearly level phase	16, 086	2. 7
Gently sloping phase	1, 127	. 2
Waverly silt loam, local alluvium phase	1, 699	. 3
Other areas, not mapped in detail	14, 720	2. 5
Total	586, 880	100. 0

[1] Less than 0.1 percent.

Use and suitability (unit IVw–2).—This fine-textured, poorly drained soil is not well suited to row crops. It is best suited to rice, hay crops, and pasture. The soil is hard to work and needs artificial drainage.

Alligator clay, gently sloping phase (3 to 7 percent slopes) (Ac).—This light-gray soil differs from Alligator clay, nearly level phase, mainly in having stronger slopes. It occurs on slack-water flats in the eastern part of the county in long narrow strips next to bayous and other streams.

The soil is medium to strongly acid. It has a moderate supply of organic matter and slow permeability.

Mapped with this soil are small moderately eroded, gently sloping areas of Alligator clay; small areas, principally in forest, that have sloping relief (7 to 10 percent slopes) and normal erosion; and small areas that have sloping relief and moderate erosion.

Use and suitability (unit IIIe–3).—The fairly small acreage of Alligator clay, gently sloping phase, is used chiefly for cotton, soybeans, and corn.

This soil is hard to work. Contour tillage and a rotation that includes close-growing crops will help to control erosion and benefit the soil.

Alligator silty clay, nearly level phase (½ to 3 percent slopes) (Ae).—This soil occurs in the eastern part of the county on slack-water flats. It was originally covered by a dense growth of various types of hardwoods.

This soil has a light-gray firm silty clay loam surface soil and a gray firm to very firm clay subsoil mottled with yellowish brown. It is medium to strongly acid and has a moderate supply of organic matter. It is slowly permeable to roots, moisture, and air.

Use and suitability (unit IIIs–2).—The use and management of this soil is the same as for Alligator clay, nearly level phase. This soil is not well suited to row crops but is well suited to rice, pasture, and hay crops. Soybeans usually do fairly well.

This soil is fairly easy to work. Its silty clay texture limits its suitability for use. Artificial drainage is needed in most places to grow row crops and pasture.

Alligator silty clay, level phase (0 to ½ percent slopes) (Ad).—This soil is similar to Alligator silty clay, nearly

level phase. The soil occurs on slack-water flats, mainly in the southeastern part of the county.

This light-gray firm silty clay soil is medium to strongly acid and has a moderate supply of organic matter. It is slowly permeable to roots, moisture, and air.

Use and suitability (unit IVw–2).—This poorly drained, fine-textured soil is fairly well suited to rice, hay crops, and pasture. Because of the level relief, water remains for long periods after rains. Artificial drainage is needed to make the soil suitable for row crops. Where the soil is to be used for pasture, artificial drainage is not always required. This soil is only fairly easy to work.

Alligator silty clay, gently sloping phase (3 to 7 percent slopes) (Ag).—This soil differs from Alligator silty clay, nearly level phase, chiefly in having stronger slopes. The surface soil is light-gray, firm silty clay, and the subsoil is gray, firm to very firm clay mottled with yellowish brown. Some areas are moderately eroded, but they are too small to be shown separately on the soil map.

This slowly permeable soil is medium to strongly acid and is moderately supplied with organic matter.

Use and suitability (unit IIIe–3).—This soil is not well suited to row crops, but it is well suited to hay, forage crops, small grains, and pasture. It is not suited to rice. This soil is fairly easy to work. Contour tillage and close-growing crops are needed to control erosion.

Alligator silty clay loam, nearly level phase (½ to 3 percent slopes) (Ah).—This soil is similar to Alligator clay, nearly level phase. It differs mainly in having a coarser textured surface soil. The soil occurs in small areas in the southeastern part of the county in association with Forestdale and Sharkey soils. The native trees were bottom-land hardwoods of various kinds.

This soil has a light-gray, firm to friable surface soil of silty clay loam and a gray, firm to very firm clay subsoil mottled with yellowish brown. It differs from Forestdale silty clay loam, nearly level phase, chiefly in having a finer textured subsoil. It differs from Sharkey silty clay loam, nearly level overwash phase, chiefly in its lighter color and slightly less distinct structure.

This soil is medium to strongly acid and low in organic matter. Permeability is moderately slow in the surface soil and slow in the subsoil.

Use and suitability (unit IIs–4).—This soil is used for corn, oats, rice, soybeans, cotton, and pasture. Because it has a surface soil of silty clay loam, it is desirable for row crops, but it usually needs artificial drainage. The soil is fairly easy to work.

Alluvial soils (0 to 7 percent slopes) (Ak).—This miscellaneous land type occurs in the area between the Mississippi River and its levee. The larger part is made up of soils of the Commerce and Robinsonville series, and the rest consists of soils of the Mhoon and Crevasse series. It has a large aggregate area of 56,033 acres and is subject to periodic overflow.

Use and suitability (unit IVw–1).—About 25 percent of this land type has been cleared and is used for cultivation. Crop production is uncertain, however, because of long-lasting, periodic overflows. None of the rest of this land has been cleared for cultivation, because the surface is too rough or the hazard of flooding is too great. In some areas excavations that were made in building the levee still remain. Part of the soil is used for temporary grazing, but none is used for permanent pasture. Forest, consisting of bottom-land hardwoods and scattered stands of willow and cottonwood, covers most of this land.

Beulah very fine sandy loam, nearly level phase (½ to 3 percent slopes) (Ba).—This light-colored, somewhat excessively drained soil occupies old natural levees bordering former channels of the Mississippi River and smaller streams on the flood plain of that river. The soil has formed from medium textured to moderately coarse textured Mississippi River alluvium. It is closely associated with Bosket very fine sandy loam, nearly level phase. It differs in having less contrast between profile horizons, more sand throughout the profile, and a lower water-holding capacity. The native trees were hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 8 inches, light brownish-gray friable very fine sandy loam; weak fine granular structure.
Subsoil
8 to 30 inches, light yellowish-brown very friable fine sandy loam; structureless (single grain).
Underlying material
30 to 42 inches, light yellowish-brown very friable sandy loam; structureless (single grain).

This soil is medium to slightly acid and very low in organic matter. Its permeability to roots, moisture, and air is rapid. The soil has a low capacity for holding water available to plants.

Some small included areas are gently sloping and are moderately eroded. Other small included areas have a silty clay loam surface soil and are nearly level. Also included are small areas of Beulah fine sandy loam, nearly level phase, and small areas of Beulah fine sandy loam, gently sloping phase, which are not mapped separately in the county. Some areas of these two included soils are moderately eroded.

Use and suitability (unit IIs–3).—Beulah very fine sandy loam, nearly level phase, is used mostly for cotton. Because of its low moisture-holding capacity, crops will be injured during dry periods. This soil is very easy to work.

Bosket very fine sandy loam, nearly level phase (½ to 3 percent slopes) (Bb).—This well-drained soil has formed from moderately fine, medium, and coarse textured Mississippi River alluvium. It occurs on old natural levees bordering former channels of the Mississippi River and smaller streams on the flood plain of that river. This soil resembles Dubbs very fine sandy loam, nearly level phase. It differs in having coarser texture and weaker profile development. Various kinds of hardwoods and a dense undergrowth of vines and canes formed the original vegetation.

The total acreage of this soil is small, but it is important to the agriculture because of its favorable physical properties. In most places it occupies elevations that are slightly higher than those of the Dundee, Dubbs, and Forestdale soils.

Profile description:

Surface soil (plow layer)
0 to 8 inches, light brownish-gray very friable very fine sandy loam; weak fine granular structure.
Subsoil
8 to 24 inches, dark-brown to brown friable sandy clay loam; nonplastic when wet and slightly hard when dry; weak medium to fine blocky structure.
Underlying material
24 to 36 inches, yellowish-brown friable sandy loam.

The texture of the subsoil ranges from sandy clay loam to silty clay loam, and the texture of the underlying material ranges from very fine sandy loam to loamy sand.

The reaction of this soil is medium to slightly acid. The soil has a low supply of organic matter and moderate permeability and water-holding capacity.

Included with this soil in mapping are small nearly level areas of fine sandy loam and silty clay loam.

Use and suitability (unit I–1).—Bosket very fine sandy loam, nearly level phase, is one of the most desirable soils for row crops. It is used chiefly for cotton. Other crops grown are corn and forage. The soil is easy to work.

Bosket very fine sandy loam, gently sloping phase (3 to 7 percent slopes) (Bc).—This soil is similar to the nearly level phase of Bosket very fine sandy loam. The principal difference is that it occupies stronger slopes. It occurs mostly in long narrow strips near Bosket very fine sandy loam, nearly level phase.

This is a medium to slightly acid soil that is low in organic matter. Its permeability and water-holding capacity are moderate.

Included with this soil are small gently sloping areas of fine sandy loam that have both normal and moderate erosion; small gently sloping areas of very fine sandy loam that have moderate erosion; and a small sloping area of very fine sandy loam that has moderate erosion.

Use and suitability (unit IIe–1).—Cotton is the main crop grown on this soil. The soil is well suited to many crops, but because of its relatively strong slopes, it is subject to erosion. To reduce erosion and hold moisture in the soil, contour tillage and rotations that include close-growing crops should be used. This soil has good workability.

Brittain silt loam, nearly level phase (½ to 3 percent slopes) (Bd).—This is a dark-colored somewhat poorly drained soil. It occupies old natural levees along small tributary streams that flow from nearby loess uplands. Silty alluvium washed from the loess uplands was its parent material. This soil closely resembles Forestdale silt loam, nearly level phase. The chief difference is that it has a higher silt content throughout the profile.

This soil is associated with the Dexter and Pearson soils that were also derived from silty alluvium. It occurs near the Jones and Porter Bayous. In most places soils of the Dexter series, Pearson series, or both, occupy the space between it and the bayous. This soil has the largest acreage of any of the silty alluvial soils. Except for Waverly silt loam, local alluvium phase, it occurs at the lowest elevation of any of the soils derived from silty alluvium. The original growth was hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 4 inches, dark grayish-brown very friable mellow silt loam; weak fine granular structure.
Subsoil
4 to 10 inches, gray to grayish-brown friable silt loam, mottled with shades of brown and yellow; structureless (massive).
Underlying material
10 to 40 inches, gray to light-gray friable silty clay loam, mottled with shades of yellow and brown; weak medium to coarse subangular blocky structure.

This soil is medium to slightly acid and low in organic matter. It is moderately permeable to roots, moisture, and air and has a moderate water-holding capacity.

Use and suitability (unit IIs–2).—Most of this soil is used for cotton, corn, and soybeans. Some parts are used for small grains, hay crops, and pasture.

The soil is generally considered good cropland, but in most places it requires some form of artificial drainage. It is easy to work.

Clack loamy sand, nearly level phase (½ to 3 percent slopes) (Ca).—This excessively drained soil has formed from coarse-textured Mississippi River alluvium. It occupies small areas on old natural levees that border former channels of the Mississippi River, or it lies along smaller streams on the flood plain of that river. The entire profile is sandy, and internal drainage is rapid. The native growth was a mixture of cottonwoods and hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 6 inches, grayish-brown loose loamy sand; structureless (single grain).
Subsurface layer
6 to 14 inches, grayish-brown to light brownish-gray loose loamy sand; structureless (single grain).
Underlying material
14 to 36 inches, grayish-brown loose to very friable loamy sand; structureless (single grain).

The surface soil is 6 to 8 inches thick. In pastured areas the soil in the upper 2 inches is dark grayish-brown loose loamy sand. The underlying material ranges from loamy sand to sand.

The reaction of the soil is medium to strongly acid, and the content of organic matter is very low. The soil has rapid permeability and a low water-holding capacity.

As mapped, this soil includes small gently sloping areas that have both normal and moderate erosion, and small areas of Dundee, Dubbs, Bosket, and Beulah soils. Also included are small moderately eroded areas of Beulah loamy sand, nearly level phase, and Beulah loamy sand, gently sloping phase. These last two included soils are not mapped separately in the county.

Use and suitability (unit IVs–1).—Clack loamy sand, nearly level phase, is very poorly suited to row crops. It is fairly well suited to hay or pasture. Bermudagrass produces fair grazing once it is established. Kudzu and sericea lespedeza can be grown, but care must be taken in getting these crops established. Where a practical irrigation system has been installed, an intensive cropping system can be planned for the soil. This soil is very easy to work.

Clack sandy loam, nearly level phase (½ to 3 percent slopes) (Cb).—This soil is similar to Clack loamy sand, nearly level phase. The main difference is that it has a less coarse and slightly heavier textured surface soil. It has very rapid internal drainage. The original trees were cottonwoods and hardwoods of various kinds. The areas of this soil are small.

This soil has a grayish-brown friable sandy loam surface layer about 8 inches thick. The subsurface layer is grayish-brown to light brownish-gray loose loamy sand about 6 inches thick. The underlying material is grayish-brown loose to very friable loamy sand about 22 inches thick.

The reaction of this soil is medium to strongly acid. The soil is low in organic matter. It has rapid permeability and low water-holding capacity.

This soil includes small gently sloping areas that have been moderately eroded, as well as small nearly level areas

that have a very fine sandy loam, silty clay loam, or silty clay surface soil. The included areas are too small to be shown separately on the map.

Use and suitability (unit IVs–1).—Clack sandy loam, nearly level phase, is used for bermudagrass, sericea lespedeza, and kudzu. These provide fair amounts of forage. Unless this soil has been irrigated, it is not suitable for row crops. The soil has excellent workability.

Commerce silt loam (½ to 3 percent slopes) (Cc).—This nearly level soil is moderately well drained to somewhat poorly drained. It has formed from fine to moderately coarse textured Mississippi River alluvium. It occurs in narrow belts on recent natural levees that border the Mississippi River, or it lies along recently abandoned cutoffs or stream channels of the river. This soil is comparable to Dundee silt loam, nearly level phase, that occurs on old narrow levees. It differs in that it is neutral to alkaline in reaction and has weak profile development. It is intermediate in drainage between Robinsonville fine sandy loam and Mhoon silt loam, which occur on recent natural levees.

Profile description:

Surface soil (plow layer)
0 to 6 inches, grayish-brown very friable silt loam; weak granular structure.
Subsurface layers
6 to 10 inches, light brownish-gray friable silt loam, faintly mottled with shades of yellow and brown; weak medium granular structure.
10 to 22 inches, grayish-brown friable silt loam, mottled with shades of brown; weak medium granular structure.
Underlying material
22 to 40 inches, light brownish-gray friable silt loam, mottled with shades of yellow and brown; structureless (massive).

The upper layer of the subsurface soil ranges in texture from silt loam to silty clay loam; the lower layer, from silt loam to silty clay loam. In some areas the soil is stratified with sandier material.

This soil has a low supply of organic matter and moderate permeability and water-holding capacity.

Included with this soil in mapping are nearly level areas of very fine sandy loam; gently sloping areas of very fine sandy loam that have normal and moderate erosion; and nearly level shallow phases of both silt loam and very fine sandy loam.

Use and suitability (unit I–1).—Commerce silt loam is well suited to most row crops, but it is used mostly for cotton. Surface runoff is slow, but it is adequate for most crops. This soil is easy to work.

Commerce silty clay loam (½ to 3 percent slopes) (Ce).—This is a nearly level, moderately well drained to somewhat poorly drained soil. It has a somewhat finer textured surface soil than Commerce silt loam, but in other physical characteristics the two soils are much the same.

The surface soil is dark-brown to grayish-brown friable silty clay loam about 6 inches thick. The subsurface layer, a grayish-brown firm silty clay to friable silty clay loam, is faintly splotched with shades of brown and yellow and is about 16 inches thick. The underlying material is light brownish-gray friable silt loam mottled with shades of yellow and brown.

This soil is neutral to alkaline in reaction and has a low supply of organic matter. Permeability and water-holding capacity are moderate.

As mapped, this soil includes small gently sloping areas and shallow nearly level areas.

Use and suitability (unit IIs–1).—Commerce silty clay loam is a desirable soil for most row crops. The largest acreage is planted to cotton, although corn and soybeans are grown.

The soil is only fairly easy to work. Natural drainageways usually remove surplus water, so runoff is seldom a problem.

Commerce silty clay (½ to 3 percent slopes) (Cd).—This is a nearly level, moderately well drained to somewhat poorly drained soil. It differs from Commerce silt loam mainly in having a fine-textured surface soil. It differs from Tunica silty clay, nearly level phase, chiefly in being neutral to alkaline instead of slightly acid to neutral.

The surface soil is dark grayish-brown to light brownish-gray firm silty clay about 6 inches thick. In the subsurface part of the profile, the upper 4 inches is dark grayish-brown to light brownish-gray firm silty clay, mottled with shades of yellow and brown. The lower part is about 12 inches thick and is grayish-brown firm silty clay, mottled with shades of yellow and brown. The underlying material is grayish-brown, friable, stratified light silty clay loam.

This soil has a moderate amount of organic matter and a moderate water-holding capacity. Permeability is moderately slow in the surface soil and slow in the subsurface layers.

Use and suitability (unit IIs–1).—Cotton, corn, soybeans, hay crops, and pasture are grown on this soil. Largely because of its fine-textured surface soil, this soil is not so desirable for row crops as Commerce silt loam and Commerce silty clay loam. The workability of Commerce silty clay is fair to poor.

Commerce-Robinsonville-Crevasse soils (½ to 3 percent slopes) (Cg).—This complex is made up of nearly level areas of soils of the Commerce, Robinsonville, and Crevasse series. Most of it consists of Commerce and Robinsonville soils. This complex occurs on recent natural levees and has formed from Mississippi River alluvium of various textures. It is somewhat poorly drained to excessively drained.

The surface soil ranges from silty clay loam to loamy sand. There is no uniformity as to the occurrence and character of the units making up this complex. In many areas the profile changes from one type to another within a distance of a few feet. Detailed descriptions of the profiles of the Commerce, Robinsonville, and Crevasse soils are given elsewhere in the report.

This soil complex is alkaline and has a low supply of organic matter. Its permeability ranges from slow to rapid, and its water-holding capacity is moderate to low. Included with this complex, as mapped, are gently sloping areas that have normal or moderate erosion.

Use and suitability (unit IIs–3).—This complex is desirable for row crops, even though some of its soils are droughty. It is used for cotton, corn, small grains, and pasture. The soils are easily worked.

Crevasse loamy sand (½ to 3 percent slopes) (Ch).—This nearly level, excessively drained soil has formed from coarse-textured Mississippi River alluvium. It occurs on recent natural levees next to, and near, other recent streams or cutoffs of the Mississippi River. It

has very weak profile development. The native trees were various kinds of hardwoods.

Profile description:

Surface soil (plow layer)
0 to 10 inches, yellowish-brown very friable loamy sand; structureless (single grain).
Subsurface layer
10 to 42 inches, yellowish-brown very friable loamy sand; the yellowish-brown color is slightly lighter than in the surface soil; structureless (single grain).
Underlying material
42 inches +, thick beds of coarse sand or loamy sand.

This soil is neutral to alkaline and has a very low supply of organic matter. Its permeability is very rapid, and its water-holding capacity low.

As mapped, this soil includes some areas that have a texture of fine sandy loam to very fine sandy loam. Most of these are gently sloping or nearly level. Some of the areas have a silty clay loam surface soil texture, and others have a sandy surface soil texture. A small part of the soil has clay or silty clay material at depths of 24 to 48 inches. A large acreage is predominantly Crevasse loamy sand but includes many areas of Sharkey, Tunica, Mhoon, Commerce, and Robinsonville soils too small to map separately.

Use and suitability (unit IVs–1).—Cottonwood trees grew up rapidly on Crevasse loamy sand after the flood of 1927. Many of these trees were later cleared so that the soil could be used for pasture. Few crops produce satisfactory yields, but when established, bermudagrass will produce fair grazing. The very rapid internal drainage and low water-holding capacity of this sandy soil limit its use. This soil is very easy to work.

Crevasse loamy sand, shallow variant (½ to 3 percent slopes) (Ck).—This excessively drained, shallow variant is distinguished by a firm to very firm clay or silty clay layer that occurs at depths of 12 to 24 inches. This layer is dark gray, mottled with yellowish red. The soil, which occurs in small areas near Scott, has formed from Mississippi River alluvium. The sandy surface soil, however, is a recent deposit left by the 1927 flood. The native forest was hardwoods, but after the 1927 flood, cottonwoods grew up on the soil.

The surface soil is a grayish-brown loose loamy sand about 6 inches thick. In pastured areas the upper 2 inches of the surface soil is very dark grayish brown. The subsurface layer, about 19 inches thick, is grayish-brown to light brownish-gray loose loamy sand in the upper part and light-gray loose loamy sand in the lower. The underlying material, about 11 inches thick, is, in the upper part, dark-gray firm silty clay, mottled with yellowish red. The lower part is dark-gray very firm clay, mottled with yellowish red.

A small part of this soil has a fine sandy loam surface soil. In some of the areas, the texture grades to loamy fine sand before the clay layer is reached. In a few places the clay layer is at depths of 7 to 20 inches, rather than at depths of 12 to 24 inches. In other places the clay is at depths of 24 to 48 inches.

This soil is neutral to alkaline, and its supply of organic matter is very low. Permeability is very rapid in the surface soil and moderate in the subsurface layer. The water-holding capacity is moderate.

Use and suitability (unit IVs–1).—A large part of this soil has been cleared and is now used chiefly for pasture. The soil is very easy to work. Because of the fine-textured underlying material, the soil retains a moderate supply of moisture for plants. The few crops grown are therefore not injured so seriously by drought as those on Crevasse loamy fine sand.

Dexter silt loam, nearly level phase (½ to 3 percent slopes) (Da).—This well-drained soil has formed from silty alluvium. It occurs on old natural levees. The levees are along tributary streams that originate in loess hills, and the silty alluvium giving rise to this soil consists mainly of loess sediments deposited by the streams.

This soil differs from Dubbs very fine sandy loam, nearly level phase, mainly in having a higher silt content. It is closely associated with the soils of the Pearson series. It differs from Pearson silt loam, nearly level phase, in being free of mottling and in having a lighter colored profile. The soil has formed from silty alluvium similar to that of Brittain silt loam, nearly level phase, but it differs from that soil in being free of mottling (*6*) and in having shades of brown as the predominant color. The native trees were mixed hardwoods. This soil occurs in rather narrow bands that border Jones and Porter Bayous.

Profile description:

Surface soil (plow layer)
0 to 5 inches, very pale brown very friable silt loam; weak fine granular structure.
Subsoil
5 to 13 inches, dark-brown friable to firm silty clay loam; weak medium subangular blocky structure.
13 to 46 inches, yellowish-brown friable to firm silty clay loam; weak medium subangular blocky structure.
Underlying material
46 to 50 inches, yellowish-brown friable very fine sandy loam.
50 to 60 inches, yellowish-brown friable fine sandy loam.

In some included areas the texture of the surface soil is very fine sandy loam. The typical soil is medium to slightly acid and low in organic matter. It has moderate permeability and a moderate water-holding capacity.

Use and suitability (unit I–1).—This is a desirable soil for row crops. It is used chiefly for cotton. A small part is used for corn, soybeans, small grains, and pasture. This soil is easy to work.

Dexter silt loam, gently sloping phase (3 to 7 percent slopes) (Db).—This soil is similar to Dexter silt loam, nearly level phase, but it has stronger slopes. It occurs next to areas of the nearly level phase.

This soil is medium to slightly acid and low in organic matter. It is moderately permeable, and its water-holding capacity is moderate.

As mapped, this soil includes small areas of moderately eroded soil. It also includes small gently sloping areas that have a very fine sandy loam surface soil.

Use and suitability (unit IIe–1).—Most of Dexter silt loam, gently sloping phase, is in pasture, but some of it is used for cotton, corn, soybeans, and small grains. This soil is easy to work. Tilling on the contour on the rather strong slopes and including close-growing crops in the rotations will help to control erosion and will benefit the soil in other ways.

Dowling clay (0 to ½ percent slopes) (Dc).—This dark-colored, poorly drained soil consists of firm clay throughout and is faintly mottled at depths below about 4 inches. It occupies depressions or abandoned channels of streams, generally in association with Sharkey, Tunica, Mhoon, Alligator, and Forestdale soils. The soil has formed from

fine-textured alluvium washed from Sharkey soils and from other associated fine-textured soils. After each rain it receives water from the surrounding slopes. It remains wet longer than most of the soils. The native vegetation was bottom-land hardwoods and cypresses and a dense growth of vines, canes, and underbrush. The soil covers a total area of 80,563 acres.

Profile description:

Surface soil (plow layer)
0 to 4 inches, dark-gray firm clay; plastic when wet, and hard when dry; weak medium to fine granular structure.
Subsoil
4 to 24 inches, gray firm clay, faintly mottled with shades of brown; plastic when wet, and very hard when dry; structureless (massive).
Underlying material
24 to 40 inches, gray firm clay, faintly mottled with various shades of brown; very plastic when wet, and very hard when dry; structureless (massive).

This soil varies somewhat; in places the surface soil is stained almost black by organic matter, and in some areas the surface soil is silty clay loam.

This soil is slightly acid to neutral. It has a moderate amount of organic matter. Its permeability is very slow.

Use and suitability (unit IVw–3).—This soil is used to some extent for soybeans, late corn, and cotton. It is poorly suited to row crops. Late corn occasionally makes fair yields, but yields of cotton are seldom satisfactory. Soybean yields vary to a great extent. The soil is suited to rice, pasture, and temporary grazing in summer, and some areas are used for these purposes. This soil is very hard to work.

Dowling soils, overwash phases (0 to ½ percent slopes) (Dd).—These soils consist of areas of Dowling soils that have different surface soil textures. These textures range from clay to silt loam. They do not occur in any definite pattern. The soils occur in depressions and in channels of former streams. They occupy narrow strips, generally in association with soils on the slack-water flats. The soils have formed from local alluvium washed from the Sharkey soils and from coarser textured associated soils. They are poorly drained. The internal movement of water is very slow. Surface runoff usually is too slow to carry off the water that accumulates from the surrounding higher elevations.

These soils are slightly acid to neutral. They have a low supply of organic matter. They are very slowly permeable.

Included with these soils in mapping are some areas that were covered by a layer of loamy sand, 6 to 12 inches thick, during the flood of 1927. These included areas are near Scott.

Use and suitability (unit IIIw–1).—Dowling soils, overwash phases, are generally farmed in conjunction with adjoining soils. They are used to some extent for corn, soybeans, and pasture. Where drainage is adequate, they grow fairly good crops.

Secondary ditches are generally necessary, and the rows should be run in the proper direction if crops are to give satisfactory yields. In most places the rows on adjoining soils should run parallel to strips of these soils. This will conserve water on the adjoining soils and prevent it from accumulating in the low areas occupied by Dowling soils, overwash phases.

These soils are fairly easy to work. They form part of the natural drainage system, however, and, if feasible, should serve as drainage outlets rather than be used for crops. The soils occur in some areas where they can be used along with adjoining soils for pasture. Such use is considered good when the soils occupy about as much acreage as adjoining better drained soils.

Dubbs very fine sandy loam, nearly level phase (½ to 3 percent slopes) (De).—This soil is moderately well drained to well drained. It has formed from stratified moderately coarse textured to fine textured Mississippi River alluvium. Its profile is moderately well developed. The soil occurs in small areas on old natural levees that border former channels of the Mississippi River and small streams of the flood plain. The native trees were hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 8 inches, grayish-brown friable very fine sandy loam; weak fine granular structure.
Subsoil
8 to 20 inches, yellowish-brown firm silty clay loam; plastic when wet, and slightly hard when dry; weak medium blocky structure.
20 to 36 inches, dark yellowish-brown friable fine sandy loam; weak medium subangular blocky structure.
Underlying material
36 to 50 inches, yellowish-brown very friable loamy sand.

In some small areas the texture of the surface soil is silt loam or silty clay loam.

This soil is strongly to slightly acid and is low in organic matter. It is moderately permeable and has a moderate water-holding capacity.

Use and suitability (unit I–1).—Practically all of this soil is used for row crops, chiefly cotton and corn, and yields are usually high. This soil is easy to work.

Dubbs very fine sandy loam, gently sloping phase (3 to 7 percent slopes) (Dg).—This soil is similar to Dubbs very fine sandy loam, nearly level phase, but it has stronger slopes and is more variable in the thickness of its profile layers. It occupies narrow strips on the old natural levees. Most of it occurs next to areas of Dubbs very fine sandy loam, nearly level phase.

This soil is strongly to slightly acid and is low in organic matter. It is moderately permeable and has a moderate water-holding capacity.

Mapped with this soil are small areas that are moderately eroded, small areas that have a silt loam or fine sandy loam surface soil, and small sloping areas that are principally in forest.

Use and suitability (unit IIe–1).—Dubbs very fine sandy loam, gently sloping phase, is used chiefly for cotton, corn, and pasture. A small part is used for soybeans and small grains.

This soil is easy to work. It produces good yields, but the erosion hazard is high. All tillage should be done on the contour, and a rotation that includes close-growing crops should be used to control erosion and conserve moisture.

Dundee silt loam, nearly level phase (½ to 3 percent slopes) (Dh).—This soil is somewhat poorly drained to moderately well drained. It has formed from stratified beds of moderately coarse textured to fine textured Mississippi River alluvium. The soil occurs in small areas on the old natural levees that border former channels of the Mississippi River and small streams on its flood plain. Its profile is moderately well developed. It is an im-

portant agricultural soil. The native trees were hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 6 inches, light brownish-gray friable silt loam; weak fine granular structure.
Subsoil
6 to 26 inches, light yellowish-brown firm silty clay, faintly mottled or splotched with shades of gray and yellow; plastic when wet, and hard when dry; moderate medium blocky structure.
Underlying material
26 to 36 inches, grayish-brown firm silty clay loam, mottled with shades of yellow and brown.

The subsoil ranges in texture from silty clay to sandy clay. The underlying material ranges from silty clay loam to sandy clay loam.

This soil is medium to strongly acid, and it is low in organic matter. Permeability and water-holding capacity are moderate.

Use and suitability (unit I–1).—Practically all of this soil is used for row crops, principally cotton. Corn and soybeans are minor crops, and a small part of the soil is used for pasture. The soil is well suited to small grains and winter grazing. Rice has been grown successfully, but because the water moves fairly rapidly through the profile, the growing of rice may not be feasible.

This soil is well suited to most crops grown locally. It is easy to work. On the basis of chemical tests and data from fertility test plots, however, it is slightly lower in productivity than the other nearly level phases of the Dundee series.

Dundee silt loam, gently sloping phase (3 to 7 percent slopes) (Dk).—This soil differs from Dundee silt loam, nearly level phase, chiefly in occupying stronger slopes. Its surface soil and subsoil are more variable in thickness, and generally they are thinner. The soil occurs in narrow strips, mainly next to areas of Dundee silt loam, nearly level phase.

This soil is medium to strongly acid and low in organic matter. It has moderate permeability and moderate water-holding capacity.

Mapped with this soil are small moderately eroded areas and small sloping areas that have both normal and moderate erosion.

Use and suitability (unit IIe–1).—Dundee silt loam, gently sloping phase, is used to some extent for corn, small grains, soybeans, cotton, and pasture. The rather strong slopes hinder regular cropping procedures that might be followed on more nearly level soils. This soil is subject to erosion. Therefore, tillage should be on the contour, and close-growing crops should be used in the rotation. This soil is easy to work.

Dundee silty clay, nearly level phase (½ to 3 percent slopes) (Dm).—This soil is similar to Dundee silt loam, nearly level phase, but it has a finer textured surface soil, and in most places the profile below the surface soil has a slightly heavier texture. The soil differs from Tunica silty clay, nearly level phase, in that it is lighter in color and has a thicker subsoil. It occurs in small areas. The native trees were hardwoods of various kinds.

The surface soil is light brownish-gray firm silty clay about 6 inches thick. The subsoil, a light yellowish-brown firm silty clay, faintly mottled or splotched with shades of gray and yellow, is about 20 inches thick. The underlying material is grayish-brown firm silty clay loam, mottled with shades of yellow and brown.

This soil is medium to strongly acid. It is low in organic matter, moderate to moderately slow in permeability, and moderate in water-holding capacity.

Mapped with this soil are small gently sloping areas (3 to 7 percent slopes) that are too small to be shown separately on the soil map. These areas would benefit from contour tillage and rotations that include close-growing crops.

Use and suitability (unit IIs–1).—Dundee silty clay, nearly level phase, is used for cotton, soybeans, corn, and pasture. The largest acreage is in cotton. The soil is desirable for crops and pasture but less so than the nearly level phases of Dundee silty clay loam, Dundee silt loam, or Dundee very fine sandy loam. It is fairly easy to work. Because of the silty clay surface soil, fall plowing is necessary in most places where the soil is to be planted to row crops.

Dundee silty clay loam, nearly level phase (½ to 3 percent slopes) (Dn).—This soil is similar to Dundee silt loam, nearly level phase. The chief difference is that it has a finer textured and, in general, a thinner surface soil. The subsoil in most places is slightly thicker than in Dundee silt loam, nearly level phase, but the texture and color are much the same. Surface runoff is slow but is adequate for most crops. The native vegetation was hardwoods of various kinds and vines and canes in a dense growth. This soil occurs in rather small areas, but it has a large total acreage.

The surface soil is light brownish-gray friable silty clay loam about 5 inches thick. The subsoil is light yellowish-brown firm silty clay; it is faintly mottled or splotched with shades of gray and yellow and is about 21 inches thick. The underlying material is grayish-brown firm silty clay loam mottled with shades of yellow and brown.

This soil is medium to strongly acid. It contains a low supply of organic matter. The permeability is moderate to moderately slow, and the water-holding capacity is moderate.

Included with this mapping unit is a small area in which the transition is abrupt to clay or silty clay at depths of 12 to 24 inches.

Use and suitability (unit IIs–1).—Cotton is the principal crop grown on Dundee silty clay loam, nearly level phase. To less extent, this soil is used for soybeans, corn, and pasture. Rice has been grown successfully, but the soil is too well suited to row crops to be used extensively for rice.

This soil is fairly easy to work. Its moderately fine textured surface soil, however, makes tillage a little more difficult than in some coarser textured soils.

Dundee silty clay loam, gently sloping phase (3 to 7 percent slopes) (Do).—This soil is similar to Dundee silty clay loam, nearly level phase, but it has stronger slopes and more variation in the thickness of the profile layers. It occurs in small narrow strips, mostly next to areas of Dundee silty clay loam, nearly level phase. The native trees were mixed hardwoods.

This soil is medium to strongly acid. It is low in organic matter. Its permeability is moderate to moderately slow, and its water-holding capacity is moderate.

Included with this soil, as mapped, are some small moderately eroded areas.

Use and suitability (unit IIIe–1).—Dundee silty clay loam, gently sloping phase, is used mostly for cotton, but a small acreage is used for corn, soybeans, and pasture. The slopes are too strong for growing rice. This soil has fair to good workability, but it is erodible. Contour tillage and rotations that include close-growing crops are needed for the control of erosion.

Dundee silty clay loam, sloping phase (7 to 10 percent slopes) (Dp).—This soil differs from Dundee silty clay loam, gently sloping phase, in that it occupies stronger slopes. A small part of this soil is moderately eroded.

Use and suitability (unit IIIe–1).—The rather strong slopes prevent this soil from being used in a cropping sequence. The soil is fairly easy to work, but it is erodible. Close-growing crops need to be grown and contour tillage practiced to control erosion.

Dundee very fine sandy loam, nearly level phase (½ to 3 percent slopes) (Dr).—This soil is somewhat poorly drained to moderately well drained. It occupies many small areas. These are on the old natural levees that border former channels of the Mississippi River and small streams in the flood plain.

This soil has formed from stratified beds of moderately coarse textured to fine textured Mississippi River alluvium. Its profile is moderately well developed. The soil closely resembles Dundee silt loam, nearly level phase, but it differs in having more sand in the surface soil. It is important agriculturally. The original vegetation was hardwoods of various kinds and a dense undergrowth of vines and canes.

The surface soil is light brownish-gray friable very fine sandy loam about 6 inches thick. The subsoil, about 20 inches thick, is light yellowish-brown firm silty clay, faintly mottled or splotched with shades of gray and yellow. The underlying material is grayish-brown firm silty clay loam mottled with shades of yellow and gray.

This soil is medium to strongly acid. It has a low supply of organic matter. Permeability and water-holding capacity are moderate.

Use and suitability (unit I–1).—This soil is excellent for crops. It is used principally for cotton. Corn, soybeans, and small grains are grown to a small extent, and some areas are used for pasture. The soil is easy to work.

Dundee very fine sandy loam, gently sloping phase (3 to 7 percent slopes) (Ds).—This soil is similar to Dundee very fine sandy loam, nearly level phase. It differs chiefly in having stronger slopes. Also, the surface soil is thicker and the subsoil is more variable and generally thinner. This soil occurs in small narrow strips that, in most places, lie next to areas of Dundee very fine sandy loam, nearly level phase. The native trees were hardwoods of various kinds.

This soil is medium to strongly acid. Its content of organic matter is low, and its permeability and water-holding capacity are moderate.

As mapped, this soil includes small moderately eroded areas. It also includes small areas that have slopes of 7 to 10 percent.

Use and suitability (unit IIe–1).—Dundee very fine sandy loam, gently sloping phase, is well suited to most crops. It is used to some extent for cotton, corn, small grains, soybeans, and pasture. This soil is easy to work, but it is more difficult to manage than Dundee very fine sandy loam, nearly level phase. It is easily eroded. Using close-growing crops in a rotation with row crops and tilling on the contour will help to control erosion.

Dundee-Clack soils, nearly level phases (½ to 3 percent slopes) (Dt).—This soil complex is comprised mainly of Dundee, Dubbs, and Bosket soils, but small areas are made up of Beulah and Clack soils. The surface soils vary considerably in texture, or from silty clay loam to loamy sand. In this complex the soils do not occur in a definite pattern. In many places one soil type occurs only a few feet from the other. The profiles of the different soils are described under the individual mapping units.

This mapping unit is similar to the Commerce-Robinsonville-Crevasse complex. It differs in being medium to strongly acid instead of alkaline and in occurring on old natural levees rather than on recent natural levees. The native trees were hardwoods of various kinds.

The content of organic matter in the soils of this complex ranges from low to very low. The natural drainage is somewhat poor to excessive. Permeability is moderately slow to rapid, and the water-holding capacity is moderate to low.

Use and suitability (unit IIs–3).—The soils of this complex are well suited to row crops, even though small areas are droughty. They are used largely for cotton, corn, small grains, soybeans, and pasture. Their workability is fair to excellent.

Dundee-Clack soils, gently sloping phases (3 to 7 percent slopes) (Du).—This soil complex is essentially the same as Dundee-Clack soils, nearly level phases. The principal difference is that it has stronger slopes. It occupies long narrow strips in areas where Dundee, Dubbs, Bosket, Beulah, and Clack soils predominate. The native trees were hardwoods of various kinds.

The soils range from medium to strongly acid. Their content of organic matter is low to very low. The water-holding capacity is low to very low, and permeability is moderately slow to rapid.

Included with this complex are small areas that are moderately eroded, and small sloping areas (7 to 10 percent slopes) that are less eroded.

Use and suitability (unit IIIs–1).—This complex is used mostly for cotton, corn, soybeans, and pasture. The workability is fair to excellent, but the soils are erodible. Tillage should be on the contour, and close-growing crops should be included in the rotation.

Forestdale silt loam, nearly level phase (½ to 3 percent slopes) (Fa).—This somewhat poorly drained to poorly drained soil has formed from stratified moderately coarse, medium textured, and fine textured Mississippi River alluvium. It has weak profile development. The soil occupies many small areas on the old natural levees that border former channels of the Mississippi River, other streams, and bayous. In most places it occurs at slightly lower elevations than the Dundee, Dubbs, Bosket, Beulah, and Clack soils, which are also on old natural levees. The native trees were hardwoods of various types.

Profile description:

Surface soil (plow layer)
0 to 6 inches, light brownish-gray friable silt loam; weak fine granular structure.

Subsoil
6 to 24 inches, grayish-brown firm silty clay, mottled with shades of gray and brown; very plastic when wet, and hard when dry; weak medium blocky structure.

Underlying material
24 to 34 inches, light-gray to gray firm silty clay loam, mottled with various shades of yellow and brown; structureless (massive).

This soil is medium to strongly acid. It has a low supply of organic matter, and its permeability is slow.

Areas of Forestdale silt loam, level phase, a soil not mapped separately in the county, are mapped with this soil. These areas were too small to be shown separately on the soil map.

Use and suitability (unit IIs–2).—Almost all of Forestdale silt loam, nearly level phase, is planted to row crops, principally cotton. A small acreage is used for corn, soybeans, rice, and pasture. This soil is easy to work, but artificial drainage may be necessary before it can be completely utilized. Adequate surface drainage usually can be provided by using small W-ditches or V-ditches placed in the adjacent depressions.

Forestdale silt loam, gently sloping phase (3 to 7 percent slopes) (Fb).—This soil is similar to Forestdale silt loam, nearly level phase, but it has stronger slopes and is more variable in the thickness of the profile layers. The small areas, some of which are moderately eroded, are widely distributed over the old natural levees.

This soil is medium to strongly acid and low in organic matter. It has slow permeability.

Use and suitability (unit IIIe–2).—This soil is used chiefly for cotton, corn, soybeans, and pasture. It is easy to work but is highly erodible. Contour tillage and rotations that include close-growing crops will help to control erosion.

Forestdale silty clay loam, nearly level phase (½ to 3 percent slopes) (Fe).—Except for its finer textured surface soil, this soil resembles Forestdale silt loam, nearly level phase. The native trees were hardwoods of various kinds.

The surface soil is light brownish-gray friable silty clay loam about 6 inches thick. The subsoil is grayish-brown firm silty clay, mottled with shades of gray and brown; it is about 18 inches thick. The underlying material is light-gray to gray firm silty clay loam, mottled with various shades of yellow and brown.

This soil is medium to strongly acid. Its content of organic matter is low. Permeability is slow.

Many areas of this soil occur at lower elevations than the typical soil. Some areas, too small to be shown separately on the soil map, are level.

Use and suitability (unit IIs–4).—Most of this soil is used for cotton, but part is used for soybeans, corn, rice, and pasture.

This soil is fairly easy to work. Corn, cotton, and pasture produce less than on Forestdale silt loam, nearly level phase. Crops will produce better yields and pastures will improve if adequate drainage is provided and other suitable management practices are applied.

Forestdale silty clay loam, gently sloping phase (3 to 7 percent slopes) (Fg).—This soil occurs on stronger slopes than Forestdale silty clay loam, nearly level phase. Otherwise, the two soils are similar. In some small areas the soil is moderately eroded. A few small areas are sloping. The soil does not occupy large areas; it occurs in rather long narrow strips throughout the old natural levees.

This soil is medium to strongly acid. It has a low supply of organic matter and slow permeability. Its drainage is somewhat poor.

Use and suitability (unit IIIe–2).—This soil is not well suited to row crops, but cotton and corn are commonly grown. Soybeans are also an important crop. The soil is suited to pasture, and a small acreage has been established. Small grains can be grown successfully. Although this soil is fairly easy to work, the rather strong slopes make management more difficult than on more nearly level areas. Rows should follow the contour, and rotations that include a close-growing crop should be used. Crops that add humus will greatly improve the tilth of the soil.

Forestdale silty clay, nearly level phase (½ to 3 percent slopes) (Fc).—This soil is similar to Forestdale silty clay loam, nearly level phase. The main difference is in the finer texture of its surface soil. Some small areas are level (0 to ½ percent slopes). The small individual areas of this soil occur mostly where old natural levees grade toward slack-water flats. The native vegetation was hardwoods of various types and a dense undergrowth of vines and canes.

The surface soil is light brownish-gray firm silty clay about 6 inches thick. The subsoil is grayish-brown firm silty clay, mottled with shades of gray and brown, and is about 18 inches thick. The underlying material is light-gray to gray firm silty clay loam, mottled with various shades of yellow and brown.

This soil is medium to strongly acid. It has a moderate supply of organic matter. Its permeability is slow.

Use and suitability (unit IIIs–2).—This soil is used to some extent for corn, cotton, rice, soybeans, and pasture. Because of its silty clay surface soil and slow internal drainage, its suitability for use is limited. The soil is not well suited to row crops. Surface runoff is generally so slow that artificial drainage must be provided if row crops are to be grown. The soil is well suited to rice, soybeans, and pasture.

This soil is hard to work. It is generally bedded in fall because its fine texture makes it difficult to prepare the soil for row crops in the spring.

Forestdale silty clay, gently sloping phase (3 to 7 percent slopes) (Fd).—This soil is similar to Forestdale silty clay, nearly level phase. It differs in having stronger slopes. Some small areas are moderately eroded. This soil occurs in long strips where the old natural levees grade toward slack-water flats. The native trees were hardwoods of various kinds.

This soil is medium to strongly acid. It has a moderate supply of organic matter and slow permeability.

Use and suitability (unit IIIe–3).—This soil is used to some extent for corn, small grains, soybeans, cotton, and pasture. It is difficult to work and is highly erodible. Using contour tillage and a rotation that includes close-growing crops will help to control erosion and improve the tilth of the soil.

Forestdale soils, nearly level phases (½ to 3 percent slopes) (Fh).—This is a somewhat poorly drained to poorly drained group of soils that have different textures. The soils were formed from moderately coarse textured to fine textured Mississippi River alluvium. The group is composed of soils of the Forestdale, Dundee, and Dubbs series. The Forestdale soils are the most extensive. The Dundee and Dubbs soils occur on small mounds scattered throughout the larger areas of Forestdale soils.

The texture of the Forestdale soils ranges from silty clay loam to silt loam. The texture of the Dubbs soils

is very fine sandy loam, and the texture of the Dundee soils ranges from silty clay to very fine sandy loam.

These soils occur in a small area about one-half mile southwest of Skene. Although some areas occupy mounds, most of the soils occur at lower elevations. Small drains and depressions form an intricate pattern throughout the areas of these soils. Some small areas mapped with these soils have slopes of 3 to 7 percent.

The native vegetation on these soils was hardwoods of various kinds and a dense growth of vines and canes.

The soils are medium to strongly acid and low in organic matter. Their permeability is slow.

Use and suitability (unit IIs–2).—These soils are used chiefly for cotton, corn, soybeans, and pasture. Their productivity generally is good, and they are fairly easy to work.

Mhoon silt loam (½ to 3 percent slopes) (Ma).—This is a nearly level, somewhat poorly drained to poorly drained soil. It occurs on recent natural levees that border the Mississippi River or lie along former channels of that river. The soil has formed from moderately coarse textured to fine textured Mississippi River alluvium. This soil is associated with Commerce and Robinsonville soils. Its predominant colors are shades of gray, as compared to the shades of brown in the Commerce and Robinsonville soils. The original vegetation was hardwoods of various kinds and a dense growth of vines, canes, and underbrush.

Profile description:

Surface soil (plow layer)
0 to 6 inches, pale-brown friable silt loam; weak fine granular structure.
Subsoil
6 to 14 inches, light-gray friable silt loam, mottled with shades of yellow and other shades of gray; weak fine granular structure.
Underlying material
14 to 24 inches, light-gray friable silty clay loam, mottled with brown and other shades of gray; structureless (massive).
24 to 36 inches, mottled gray, yellow, and brown firm silty clay loam; structureless (massive).

The texture of the subsoil and underlying material in this soil ranges from silty clay to silt loam.

This soil is neutral to alkaline and is low in organic matter. Permeability is slow to moderately slow, and the water-holding capacity is moderate.

Included in this mapping unit are some areas of shallow and overwash phases of Mhoon silt loam. These shallow and overwash phases are not mapped separately in the county. In the shallow phase, the transition is abrupt from the soil materials in the upper part of the profile to clay or silty clay that occurs at depths of 12 to 24 inches. In the overwash phase, the transition is abrupt from the material in the upper part of the profile to clay or silty clay that occurs at depths of 6 to 12 inches. Small areas of Mhoon very fine sandy loam and small areas of Mhoon very fine sandy loam, shallow phase, not mapped separately in this county, are also included in the mapping unit.

Use and suitability (unit IIs–2).—Mhoon silt loam is used chiefly for cotton, corn, soybeans, and pasture. The productivity of this soil is generally somewhat lower than that of the associated Commerce and Robinsonville soils. In most places Mhoon silt loam occurs at lower elevations than the associated soils and therefore requires more surface drainage. This soil is easy to work.

Pearson silt loam, nearly level phase (½ to 3 percent slopes) (Pa).—This moderately well drained soil occurs mostly in areas where Dexter and Brittain soils predominate. The areas occur next to the Jones and Porter Bayous on old natural levees of tributary streams that originate in the loess hills. This soil has formed from silty alluvium derived from the loess hills. It is intermediate in position and drainage between the Dexter and Brittain soils. The native trees were hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 5 inches, very pale brown very friable silt loam; weak fine granular structure.
5 to 9 inches, very pale brown very friable silt loam; few, faint, fine mottles of light gray; structureless (massive).
9 to 15 inches, yellowish-brown friable silt loam mottled with light gray; weak medium subangular blocky structure.
Subsoil
15 to 22 inches, yellowish-brown friable silt loam mottled with light gray; weak medium subangular blocky structure. This layer differs from the foregoing layer chiefly in having slightly darker shades of yellowish brown.
22 to 26 inches, dark yellowish-brown friable to firm silty clay loam mottled with light brownish gray; moderate medium subangular blocky structure.
Underlying material
26 to 35 inches, grayish-brown friable to firm silty clay loam splotched with dark brown; weak medium subangular blocky structure.
35 to 68 inches, yellowish-brown firm silty clay loam; few, faint, fine mottles of light brownish gray; weak medium subangular blocky structure.
68 inches +, brown friable very fine sandy loam; a few, faint, fine mottles of gray; structureless (single grain).

In some small areas the surface layer of this soil is very fine sandy loam. In one small area it is silty clay loam.

This soil is strongly to slightly acid. Its content of organic matter is low. Permeability is slow, and the water-holding capacity is low.

Use and suitability (unit I–1).—This soil is well suited to most row crops, but it is used chiefly for cotton. Smaller acreages are used for corn, soybeans, and pasture. The soil is also well suited to truck crops and small grains and to temporary winter grazing. Surface runoff is usually adequate if crop rows are run so as to accelerate runoff. This soil is easy to work.

Pearson silt loam, gently sloping phase (3 to 7 percent slopes) (Pb).—This soil is similar to Pearson silt loam, nearly level phase, in texture and color, but it has stronger slopes. It occurs in small narrow bands next to the Jones and Porter Bayous.

This soil is strongly to slightly acid and contains a low supply of organic matter. Its permeability and water-holding capacity are moderate.

As mapped, this soil includes some small moderately eroded areas. It also includes some small areas of Pearson silt loam that have slopes of 7 to 10 percent.

Use and suitability (unit IIe–1).—Pearson silt loam, gently sloping phase, is used mainly for corn, small grains, soybeans, cotton, and pasture. This soil is easy to work, but because of the fairly strong slopes, contour tillage and rotations that include close-growing crops are needed to help control erosion.

Robinsonville fine sandy loam (½ to 3 percent slopes) (Ra).—This is a nearly level, well-drained soil formed from moderately coarse textured to medium textured Mississippi River alluvium. It occupies rather small areas on

recent natural levees that border the Mississippi River. It is similar to Bosket very fine sandy loam, nearly level phase, that occurs on old natural levees, but unlike that soil it is neutral to alkaline instead of medium to slightly acid. The native trees consisted of hardwoods and a dense growth of vines, underbrush, and canes.

Profile description:

Surface soil (plow layer)
0 to 8 inches, yellowish-brown very friable fine sandy loam; weak fine granular structure.
Subsurface
8 to 14 inches, dark grayish-brown very friable silt loam; structureless (massive).
Underlying material
14 to 36 inches, yellowish-brown very friable fine sandy loam; structureless (single grain).
36 to 40 inches, light yellowish-brown very friable fine sandy loam; structureless (single grain).

This soil is low in organic matter. Its permeability and water-holding capacity are moderate.

Included in this mapping unit are some areas that have a surface soil of very fine sandy loam. In other areas the surface soil is fine sandy loam, but the profiles are shallow. Some small included areas have a surface soil of fine sandy loam but occupy gently sloping relief (3 to 7 percent slopes). Also included is a small acreage of nearly level, somewhat excessively drained soils that have surface soils of very fine sandy loam or fine sandy loam. Among these somewhat excessively drained soils are a few small areas that have shallow profiles.

Use and suitability (unit I–1).—Robinsonville fine sandy loam is an excellent soil for row crops and is considered one of the best agricultural soils in the county. It is used chiefly for cotton, but corn and soybeans are also grown. It has a wide range of suitability and is very easy to work.

Sharkey clay, nearly level phase (½ to 3 percent slopes) (Sb).—This dark-colored, poorly drained soil has formed from fine-textured Mississippi River alluvium. It occurs on slack-water flats. It is one of the most extensive soils in the county. This soil is closely associated with Alligator clay, nearly level phase, but differs in having a darker color. The native trees were bottom-land hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 6 inches, very dark grayish-brown firm clay; plastic when wet, and hard when dry; moderate fine granular structure.
Subsurface layer
6 to 48 inches +, very dark gray very firm clay, mottled with brown and with other shades of gray; very plastic when wet, and hard when dry; structureless (massive).

The color of the surface soil ranges from grayish brown to very dark grayish brown. The color of the subsurface layer ranges from very dark grayish brown to very dark gray.

In most areas this soil is medium acid to neutral, but in some areas it has an alkaline subsurface layer. The soil contains a moderate amount of organic matter. It has slow permeability.

Use and suitability (unit IIIs–2).—Most of this soil has been cleared and is under cultivation or in pasture. Good yields are obtained when the soil is first cropped. After it has been cropped for a short time, it loses its natural fertility and yields generally become low for most row crops. Also, because of its high content of clay, this soil is usually either too wet or too dry for tillage. Even though the soil is not well suited to them, row crops are the principal crops grown. The soil would be better for pasture, hay, or rice. Soybeans ordinarily make fair yields.

Sharkey clay, level phase (0 to ½ percent slopes) (Sa).—This soil is similar to Sharkey clay, nearly level phase. The principal difference is that it is level and needs more artificial drainage. It occurs in small areas throughout the slack-water flats.

This soil is medium acid to neutral. It has a moderate supply of organic matter and slow permeability.

Use and suitability (unit IVw–2).—This soil is used for corn, small grains, soybeans, cotton, and pasture. It is poorly suited to most row crops but produces fair yields of soybeans. It is well suited to rice and pasture.

This soil is difficult to work. Because it is level and has a high content of clay, artificial drainage is necessary.

Sharkey clay, gently sloping phase (3 to 7 percent slopes) (Sc).—This soil is closely associated with Sharkey clay, nearly level phase. It differs chiefly in having stronger slopes. It occurs in small narrow areas on the slack-water flats. Some of the small included areas are moderately eroded.

This soil is medium acid to neutral. Its content of organic matter is low. It has slow permeability.

Use and suitability (unit IIIe–3).—This soil is used for corn, small grains, soybeans, cotton, and pasture. It is not well suited to row crops but is better for hay, rice, and pasture.

This soil is difficult to work. It is subject to erosion in some places, so tillage should be on the contour.

Sharkey silty clay, nearly level phase (½ to 3 percent slopes) (Se).—This soil of the slack-water flats has formed from fine-textured Mississippi River alluvium. The individual areas are rather large. This soil is similar to Sharkey clay, nearly level phase, in that it is poorly drained, has the same color characteristics, and has a clay subsurface layer. It differs chiefly in having a silty clay surface soil. It closely resembles Alligator silty clay, nearly level phase, also on slack-water flats; it differs from that soil chiefly in having a darker color. The original vegetation was bottom-land hardwoods and a dense growth of vines and canes.

The surface soil is very dark grayish-brown firm silty clay about 6 inches thick. The subsurface layer, about 48 inches thick, is very dark gray very firm clay, mottled with brown and other shades of gray.

This soil is medium acid to neutral. It has a moderate supply of organic matter. Permeability is slow.

Included in this mapping unit is a small area of Mhoon silty clay, nearly level phase, which is not mapped separately in the county. This inclusion has a pale-brown, firm silty clay loam surface soil and a light-gray, very firm clay subsoil, mottled with shades of yellow and other shades of gray. It is alkaline in reaction.

Use and suitability (unit IIIs–2).—Most of Sharkey silty clay, nearly level phase, is used for pasture and for row crops, mainly corn and cotton. Small grains and soybeans are also grown. The soil is not well suited to row crops. It is suited to rice, hay, and pasture and is fairly well suited to soybeans. This soil has fair to poor workability. It is one of the most difficult soils to manage.

Sharkey silty clay, level phase (0 to ½ percent slopes) (Sd).—This poorly drained soil is similar to Sharkey silty

clay, nearly level phase. The chief difference is that it is level. The small areas are distributed throughout the slack-water flats.

The native vegetation was bottom-land hardwoods of various kinds and an undergrowth of vines and canes. This soil is medium acid to neutral. It has a moderate supply of organic matter and slow permeability.

Use and suitability (unit IVw–2).—This soil is poorly suited to most row crops, but row crops are grown in some places. Some areas are used for pasture. Because the soil is level and has a fine texture, artificial drainage is necessary before the soil can be used for row crops or pasture. The soil is well suited to rice. Its workability is fair to poor.

Sharkey silty clay, gently sloping phase (3 to 7 percent slopes) (Sg).—This poorly drained soil is closely associated with Sharkey silty clay, nearly level phase. It differs from that soil mainly in having stronger slopes. A small area of the soil is moderately eroded.

This soil is medium acid to neutral. It contains a moderate supply of organic matter and is slowly permeable.

Use and suitability (unit IIIe–3).—This soil is used chiefly for row crops and pasture. Corn, cotton, small grains, and soybeans are the chief crops. Rice is not grown.

This soil is fairly hard to work. The rather strong slopes make it subject to erosion, so contour tillage is desirable.

Sharkey silty clay loam, nearly level overwash phase (½ to 3 percent slopes) (Sh).—This poorly drained soil occurs on slack-water flats. The individual areas are small. The soil is similar to Sharkey clay, nearly level phase. It differs in that it has a moderately fine textured surface soil. It differs from Forestdale silty clay loam, nearly level phase, in having a darker colored surface soil and a finer texture below the surface soil. It differs from the Alligator silty clay loam, nearly level phase, in having a darker colored profile. The original vegetation was bottom-land hardwoods and an undergrowth of vines and canes.

The surface soil is very dark grayish-brown, friable to firm silty clay loam about 6 inches thick. The subsurface layer—a very dark gray, very firm clay—is mottled with brown and other shades of gray and is about 48 inches thick.

This soil is medium acid to neutral and low in organic matter. Its permeability is slow.

As mapped, this soil includes a small area of Mhoon silty clay loam, nearly level phase, which is not mapped separately in the county. This included soil differs mainly in having a pale-brown surface soil, a light-gray subsoil, mottled with shades of yellow and other shades of gray, and an alkaline reaction.

Use and suitability (unit IIs–4).—Sharkey silty clay loam, nearly level overwash phase, is used chiefly for soybeans, cotton, and corn and is well suited to these crops. Some of the soil is used for pasture. The soil is fairly easy to work.

Sharkey very fine sandy loam, nearly level overwash phase (½ to 3 percent slopes) (Sk).—This poorly drained soil is composed of medium-textured and fine-textured materials derived from Mississippi River alluvium. In some places the soil originated from sediments deposited as a result of sheet erosion. In most places, however, it was derived from sediments deposited by streams. It is similar to Sharkey clay, nearly level phase. It differs in having a considerably thicker, very fine sandy loam surface soil. Below the surface soil, the texture is clay similar to that of the subsurface soil of Sharkey clay, nearly level phase. The small areas of this soil occur mostly at the places where the old natural levees adjoin the slack-water flats.

Profile description:

Surface soil (plow layer)
- 0 to 6 inches, dark grayish-brown very friable very fine sandy loam; weak fine platy structure.
- 6 to 9 inches, very dark gray friable very fine sandy loam; common distinct medium yellowish-red mottles; weak fine platy structure.
- 9 to 12 inches, grayish-brown to dark-gray friable very fine sandy loam; weak fine platy structure.

Subsurface layers
- 12 to 21 inches, very dark gray, very firm clay; structureless (massive).
- 21 to 40 inches, dark-gray very firm clay, mottled with strong brown; structureless (massive).

This soil is slightly acid to neutral, and its content of organic matter is low. Permeability is moderately rapid in the surface soil and slow in the subsurface layer. In some small areas this soil has a silt loam surface layer.

Use and suitability (unit IIs–2).—This soil is fairly desirable for most crops. It is used for cotton, corn, and soybeans. Except in excessively wet years, these crops yield well. This soil is easy to work.

Sharkey-Clack soils, nearly level phases (½ to 3 percent slopes) (Sm).—This soil complex is comprised mainly of soils of the Sharkey and Clack series, but it includes soils of the Tunica, Forestdale, Dundee, Dubbs, Bosket, and Beulah series. In most places the soils are fine textured and poorly drained to somewhat poorly drained. In some small areas, however, they are coarse textured to medium textured and are excessively drained or somewhat excessively drained. Many small areas of the soils are droughty. Drainage is seldom a problem, because there is enough slope to carry off excess water.

This complex occurs in small areas that are distributed throughout the slack-water flats. It occurs mostly where the elevation changes abruptly from that of old natural levees to that of slack-water flats. The native growth was bottom-land hardwoods of various kinds. The areas of the different soils are so small and intricately associated that their separation on the map was not feasible. The individual soils are described in detail elsewhere in this report.

The soils of this complex are strongly acid to neutral. They vary considerably in content of organic matter. Permeability ranges from slow to rapid.

Included in this mapping unit are small areas in which the soil is composed of a layer of dark-colored clay over a layer of dark-colored coarse sand. The clay layer is 18 to 20 inches thick.

Use and suitability (unit IIIs–2).—Cotton, corn, and soybeans are the chief crops grown on this complex. The time of maturity of these crops varies considerably because of the variability of the soils that make up the complex. The workability of the soils ranges from poor to excellent.

Sharkey-Clack soils, gently sloping phases (3 to 7 percent slopes) (Sn).—This soil complex is similar to Sharkey-Clack soils, nearly level phases. The chief difference is that it occupies stronger slopes and is more

variable in physical characteristics. This complex is poorly drained to excessively drained. It occurs in long narrow strips next to bayous and other streams.

The soils of this complex are strongly acid to neutral. They vary somewhat in content of organic matter. Permeability is slow to rapid.

Moderate erosion occurs in some small areas. Some included areas that have stronger slopes, and a small included overwash area, are also moderately eroded. The overwash area has a dark-colored friable surface layer of silt loam that is 6 to 12 inches thick. The surface layer is underlain by dark-colored very firm silty clay. These included areas are too small to be shown separately on the soil map.

Use and suitability (unit IIIe–3).—Most of this soil complex is in forest, but some areas are used to grow cotton, corn, and soybeans. The slopes are short and subject to erosion. Tillage therefore should be on the contour, and close-growing crops or sod crops should be grown. The workability of the soils ranges from poor to excellent.

Souva soils (0 to ½ percent slopes) (So).—These level soils are somewhat poorly drained to moderately well drained. They vary somewhat in the color and thickness of their profile layers. They occur mostly at lower elevations in the general area in which Bosket, Dubbs, Robinsonville, Commerce, and Dundee soils predominate. The Souva soils were derived from medium textured to moderately fine textured local alluvium washed mainly from the Bosket, Dubbs, and Dundee soils. They occupy long narrow strips in depressions and in former channels of small streams. Runoff from the surrounding higher soils accumulates on these soils, and they remain wet longer than the adjacent higher lying soils. The native vegetation was bottom-land hardwoods and a dense growth of vines, canes, and underbrush.

Profile description:

Surface soil (plow layer)
0 to 6 inches, grayish-brown friable silty clay loam; weak fine granular structure.
Subsoil
6 to 20 inches, gray friable to firm silty clay loam, mottled with shades of brown and yellow; structureless (massive).
Underlying material
20 to 36 inches, gray firm silty clay, mottled with shades of yellow and brown; structureless (massive).

The surface soil ranges in color from grayish brown to dark grayish brown and in thickness from 6 to 10 inches. In some small areas the texture of the surface soil is very fine sandy loam or silt loam. The subsoil and underlying material are gray to grayish brown. The subsoil is 6 to 14 inches thick, and the underlying material is 16 inches or more thick. In areas that vary from the typical profile, the mottles in the subsoil and underlying material have the same color as the mottles in the typical profile.

The surface soil and subsoil are medium acid to neutral, and the underlying material is medium acid to slightly acid. The soils have a moderate supply of organic matter. Permeability is slow to moderately slow.

Use and suitability (unit IIw–1).—These soils are used mostly for cotton, corn, and forage crops. They are fairly easy to work. Their suitability for crops can be improved by artificial drainage.

Tunica silty clay, nearly level phase (½ to 3 percent slopes) (Ta).—This somewhat poorly drained soil has formed from fine textured to moderately fine textured Mississippi River alluvium. It resembles Sharkey clay, nearly level phase, with which it is closely associated. The chief difference is that this soil was formed from thin beds of clay, underlain at depths of 18 to 30 inches or more by moderately fine textured to coarse textured alluvial materials.

This soil occupies narrow strips throughout the slack-water flats. In most places it occurs at slightly higher elevations than the Sharkey soils. Normally, it occurs at slightly lower elevations than the soils on the recent natural levees. It has the best drainage of any soil of the slack-water flats.

Profile description:

Surface soil (plow layer)
0 to 4 inches, dark grayish-brown firm silty clay; plastic when wet, and hard when dry; moderate medium granular structure.
Subsurface
4 to 18 inches, dark-gray firm clay, faintly mottled with brown and other shades of gray; very plastic when wet, and very hard when dry; weak medium subangular blocky structure.
Underlying material
18 to 30 inches, mottled gray and yellow friable silty clay loam; structureless (massive).
30 inches+, silty or sandy friable alluvial material.

The upper part of the underlying material ranges from silty clay loam to silt loam in texture. In some places it consists of stratified thin beds of sand and clay.

This soil is slightly acid to neutral. It contains a moderate amount of organic matter. Permeability is slow to moderate.

Use and suitability (unit IIs–1).—This soil is used for cotton, corn, and soybeans, but mostly for cotton. It is the most desirable soil of the slack-water flats for most of the commonly grown row crops. It has fair to poor workability.

Tunica silty clay, gently sloping phase (3 to 7 percent slopes) (Tb).—This soil is similar to Tunica silty clay, nearly level phase. It differs chiefly in having stronger slopes. It occurs in narrow strips next to bayous and other streams and on narrow ridges.

This soil is slightly acid to neutral. It has a moderate supply of organic matter. Permeability is slow to moderate.

This soil, as mapped, includes small areas that are moderately eroded. It also includes small moderately eroded areas that have slopes of 7 to 10 percent.

Use and suitability (unit IIIe–1).—This soil is used for cotton, corn, and soybeans, but mostly for cotton. Its workability is fair to poor, and the soil is subject to erosion. Erosion can be controlled by using management practices that include contour tillage.

Waverly silt loam, local alluvium phase (0 to ½ percent slopes) (Wa).—This poorly drained soil has formed from local silty alluvium washed largely from Dexter, Pearson, and Brittain soils. It occupies depressions in the Mississippi River flood plain. Because of its low position, it remains wet longer than the associated Dexter, Pearson, and Brittain soils.

This soil occurs in rather long narrow strips near the Jones and Porter Bayous, within larger areas of associated soils. It receives the runoff water from the associated soils and is also subject to backwater flooding because of its low position. The soil is similar to the Dowling and Souva soils that also occur in depressions or former

channels of streams. It differs in having a considerably higher content of silt. The native trees were hardwoods of various kinds.

Profile description:

Surface soil (plow layer)
0 to 6 inches, pale-brown to grayish-brown friable silt loam, mottled with shades of yellow and other shades of brown; weak fine granular structure; small dark-colored concretions common.

Subsoil
6 to 20 inches, light-gray to grayish-brown friable silty clay loam, mottled with shades of yellow and other shades of brown; structureless (massive).

Underlying material
20 to 24 inches, light-gray friable to firm silty clay, mottled with shades of yellow and red; structureless (massive).

This soil is medium to strongly acid. It contains a moderate supply of organic matter. Permeability is slow.

Included with this soil in mapping are some areas of Dyer silty clay loam, which is not mapped separately in this county. This included soil differs chiefly in having a finer textured surface soil.

Use and suitability (unit IIIw–1).—Waverly silt loam, local alluvium phase, is usually farmed along with the adjoining soils. It is suited to pasture and to temporary grazing in summer. Small grains and cotton, as a rule, are not grown successfully. If proper artificial drainage is provided, yields of corn and soybeans are fair. This soil has good workability. It needs adequate surface drainage, however, for best use. It is part of the natural drainage pattern and where feasible should be used as locations for ditches.

Capability Groups of Soils

The soils of Bolivar County have been placed in capability classes, subclasses, and units. The capability grouping is an arrangement of soils to show relative suitability for crops, grazing, forestry, or wildlife. Soils that are nearly level, well drained, free from overflow, fairly fertile, and not otherwise limited are placed in class I. They are widely adaptable. The farmer can use his class I soils for crops without special practices and can choose one of several cropping systems; if he wishes he may use the soil for pasture or for some other purpose.

Soils are placed in class II if they are a little less widely adaptable and thus more limited than those in class I. A gently sloping soil, for example, must be farmed on the contour, kept under vegetation most of the time, or handled in some other manner to control erosion. Other soils may be in class II because they are too droughty, too wet, too sloping, or too shallow to be in class I.

Class III contains the soils that are suitable for regular cropping but that have narrower adaptations for use or more stringent management requirements than those in class II. The soils that are even more limited and that have narrower crop adaptations than those of class III, but that are still usable for tillage part of the time or with special precautions, are placed in class IV.

Four more classes of soils not suited to cultivation are defined in the general scheme, but none of the soils in Bolivar County are in these classes.

Subclasses.—Within each of the capability classes, except class I, there are subclasses, based on the dominant kind of limitation or hazard. The principal limitations or hazards are erosion, indicated by the letter (e) following the class number; excess water, indicated by the letter (w) following the class number; and certain soil conditions, indicated by the letter (s). For example, class II is a broad group in which there are soils subject to moderate limitations, or hazards, but that can be cultivated safely with suitable practices. For some of the soils in class II, erosion is the dominant hazard, and this is indicated by the symbol IIe.

Groups of similar soils within a class and subclass make up capability units, which are indicated by symbols IIe–1, IIe–2, and so on. In the following pages, the capability units of each class are described and their use and management are discussed.

Capability Class I

The soils of capability class I have no serious limitations for use. They are not subject to erosion, serious drought, wetness, or other limitation. They can be cultivated without risk by using ordinary farming practices.

Capability unit I–1

The soils of capability unit I–1 are the following:

Bosket very fine sandy loam, nearly level phase.
Commerce silt loam.
Dexter silt loam, nearly level phase.
Dubbs very fine sandy loam, nearly level phase.
Dundee silt loam, nearly level phase.
Dundee very fine sandy loam, nearly level phase.
Pearson silt loam, nearly level phase.
Robinsonville fine sandy loam.

The soils of capability unit I–1 are nearly level (½ to 3 percent slopes). The Commerce and Robinsonville soils are on recent natural levees, but the others are on old natural levees. Surface runoff for all the soils is slow but adequate, and internal drainage is medium. The soils are not subject to erosion. They are easily worked, and good tilth is easy to maintain. Except for the Pearson soil, which has slow permeability and low water-holding capacity, these soils have moderate permeability and water-holding capacity. They are well suited to intensive use and can be used continuously for some of the more important crops.

Use and management.—The soils of capability unit I–1 are exceptionally well suited to cotton and are used mainly for that crop. They are also well suited to corn, soybeans, small grains, truck crops, and pasture.

No special management is required for these soils. Contour cultivation, however, is usually desirable to conserve moisture and to prevent nearby depressions from receiving excess water from the higher elevations. For row crops, preparing the land should be postponed until spring. The use of cover crops is desirable. These soils can be planted to row crops year after year if legumes are used for cover crops, or commercial fertilizer with a high nitrogen value is added, or both, and will maintain production at a high level.

These soils are suited to most of the grass-legume mixtures grown locally. They are well suited to winter grazing. These soils are not well suited to rice or to other shallow-rooted crops.

Capability Class II

Capability class II is a broad grouping of soils that can be cultivated safely with easily applied practices. The soils have some limitations, but these can be overcome by good management. These soils are grouped in capability units IIe–1, IIw–1, IIs–1, IIs–2, IIs–3, and IIs–4.

Capability unit IIe–1

The soils of capability unit IIe–1 are the following:

Bosket very fine sandy loam, gently sloping phase.
Dexter silt loam, gently sloping phase.
Dubbs very fine sandy loam, gently sloping phase.
Dundee silt loam, gently sloping phase.
Dundee very fine sandy loam, gently sloping phase.
Pearson silt loam, gently sloping phase.

These gently sloping soils (3 to 7 percent slopes) occur on old natural levees. They have slow to medium surface runoff and medium internal drainage. These soils are low in organic matter. The reaction of the soils ranges from strongly to slightly acid.

These soils are easy to work, but they are subject to erosion. They have good tilth and favorable moisture relations for most of the commonly grown crops.

Use and management.—The soils of capability unit IIe–1 are well suited to cotton and are used chiefly for that crop. They are equally well suited to corn, soybeans, small grains, truck crops, and pasture.

Contour cultivation is desirable on these soils. If used for row crops, one-half of the soils should have a protective cover of close-growing crops. Rotations of 2 years of row crops followed by 2 years of close-growing crops are suggested. All tillage in preparation for row crops should be done in the spring. Nitrogen fertilizer is needed to obtain best yields.

These soils are suited to most good grass-legume mixtures used in this area. They are well suited to temporary winter grazing.

Capability unit IIw–1

The Souva soils are the only soils in capability unit IIw–1. These soils occur in depressions or in channels of former streams. They have 0 to ½ percent slopes. If adequate surface drainage is provided, they are fairly easy to work. They are subject to intermittent flooding by water that runs off adjacent areas of higher lying soils. In most places it is hard to obtain adequate surface drainage because of the low positions occupied by the soils. Internal drainage is slow to medium.

Use and management.—Some form of artificial surface drainage is generally necessary for best results on the soils of capability unit IIw–1 because the soils are part of the natural drainage system. The soils are suited to cotton, corn, and soybeans if adequate surface drainage is provided. Drainage can be improved by proper row arrangement or by using shallow V-ditches or W-ditches.

These soils are not well suited to deep-rooted perennial crops, small grains, and winter grazing crops. They are well suited to temporary summer grazing. Because of the small size or irregular shape of the areas, the soils are usually cultivated along with the adjoining soils.

Capability unit IIs–1

The soils in capability unit IIs–1 are the following:

Commerce silty clay loam.
Commerce silty clay.
Dundee silty clay, nearly level phase.
Dundee silty clay loam, nearly level phase.
Tunica silty clay, nearly level phase.

The soils of capability unit IIs–1 are nearly level (½ to 3 percent slopes). The Commerce soils occupy recent natural levees; the Dundee soils, old natural levees; and the Tunica soil, slack-water flats. Surface runoff is adequate where proper drainage has been provided for nearby depressions. Internal drainage ranges from medium to slow.

The Commerce soils are neutral to alkaline, the Dundee soils are medium to strongly acid, and the Tunica soil is slightly acid to neutral. In Commerce silty clay and in the Tunica soil, the supply of organic matter is moderate, but in the rest of the soils it is low.

Use and management.—These moderately fine textured to fine textured soils are well suited to cotton, corn, soybeans, deep-rooted perennials, and pasture. They are well suited to small grains and are among the most desirable soils for alfalfa. The use of these soils is limited by their fairly heavy surface soil and somewhat unfavorable natural drainage.

Rice has been grown successfully on some of these soils. Water generally moves through these soils too rapidly, however, for the water table to remain high enough for rice to grow successfully. These soils also require more water for rice to grow successfully than poorly drained soils with finer, heavier texture.

The use of cover crops is limited by the fairly heavy surface soil that needs to be prepared in the fall. Contour cultivation generally is desirable.

These soils are excellent for permanent pasture and are suited to most grasses and legumes grown locally. They are not well suited to temporary winter grazing, unless a heavy sod has been established.

Capability unit IIs–2

The soils in capability unit IIs–2 are the following:

Brittain silt loam, nearly level phase.
Forestdale silt loam, nearly level phase.
Forestdale soils, nearly level phases.
Mhoon silt loam.
Sharkey very fine sandy loam, nearly level overwash phase.

The soils of this capability unit are nearly level (½ to 3 percent slopes). The Brittain and Forestdale soils are on old natural levees; the Mhoon soil is on recent natural levees; and the Sharkey soil is on slack-water flats.

Except for Forestdale soils, nearly level phases, which are fairly easy to work, all of these soils are easy to work. The Brittain soil is medium to slightly acid. Forestdale silt loam, nearly level phase, and Forestdale soils, nearly level phases, are medium to strongly acid. The Mhoon soil is neutral to alkaline. The Sharkey soil is slightly acid to neutral. The soils all have a low supply of organic matter. Surface runoff is slow and generally inadequate. It can be accelerated by placing small V- or W-ditches in the adjacent depressions.

Use and management.—The soils of capability unit IIs–2 are fairly well suited to cotton, corn, soybeans, small grains, and pasture. They are not well suited to deep-rooted perennials. Although the soils are suited to rice, little rice has been grown.

These soils tend to be cold. Nevertheless, if well managed they will produce good yields of most row crops. The soils should be prepared for row crops in the spring. The row crops should be followed by winter legumes. Irrigation can be practiced without serious loss of water.

The addition of nitrogen fertilizer is helpful in obtaining satisfactory yields. Brittain silt loam, nearly level phase, may need potash if cotton is grown.

These soils are well suited to most grass-legume mixtures grown locally. They are fairly well suited to temporary winter grazing, but a good sod should be established before the pasture is grazed. The soils are well suited to summer temporary grazing.

Capability unit IIs–3

The soils of capability unit IIs–3 are the following:

Beulah very fine sandy loam, nearly level phase.
Commerce-Robinsonville-Crevasse soils.
Dundee-Clack soils, nearly level phases.

The soils of capability unit IIs–3 are nearly level. The Beulah, Dundee, and Clack soils occur on old natural levees and the Commerce, Robinsonville, and Crevasse soils on recent natural levees.

Beulah very fine sandy loam, nearly level phase, is somewhat excessively drained and has a low water-holding capacity. It is medium to slightly acid and very low in organic matter. Commerce-Robinsonville-Crevasse soils are somewhat poorly drained to excessively drained and have a moderate to low water-holding capacity. They are alkaline in reaction and low in content of organic matter. Dundee-Clack soils, nearly level phases, are somewhat poorly drained to excessively drained and have a moderate to low water-holding capacity. They are medium to strongly acid and are low to very low in content of organic matter. The Beulah soil is very easy to work, and the two soil complexes are fairly easy to very easy to work.

Use and management.—The soils of capability unit IIs–3 are well suited to early truck crops, early corn, and small grains. They are fairly well suited to cotton, soybeans, and summer annuals but are not well suited to rice.

In normal years the sandy soils in the two soil complexes are too droughty for row crops. These sandy soils occupy rather small areas, but because they are droughty, they reduce the yields of the other soils in the complexes. The other soils in the complexes will produce good yields of cotton, corn, soybeans, small grains, and truck crops.

The Beulah soil has a low water-holding capacity. Cotton, corn, soybeans, and summer annuals on this soil generally do not grow well because they lack moisture. Nevertheless, this soil usually has enough moisture for small grains and for early truck crops.

If row crops are grown on these soils, a good management practice would be to plant half of the soils to close-growing legumes or sod crops to maintain the supply of organic matter. The soils should be prepared for row crops in the spring. Winter legumes should follow the row crops.

These soils are fairly well suited to summer permanent pasture. They are well suited to temporary winter grazing but may be too droughty for temporary summer grazing.

Capability unit IIs–4

The soils in capability unit IIs–4 are the following:

Alligator silty clay loam, nearly level phase.
Forestdale silty clay loam, nearly level phase.
Sharkey silty clay loam, nearly level overwash phase.

These nearly level soils have fairly heavy surface soils and heavy suboils. The Alligator and Sharkey soils are on slack-water flats, and the Forestdale soil is on old natural levees. It is difficult to maintain good tilth in these soils. The soils are only fairly easy to work. Their surface runoff and internal drainage are slow, and they are low in organic matter. The Alligator and Forestdale soils are medium to strongly acid, and the Sharkey soil is medium acid to neutral.

Use and management.—The soils of capability unit IIs–4 are excellent for rice, hay, and grasses. They are well suited to small grains, soybeans, and lespedeza but are only fairly well suited to row crops.

The slow surface runoff can be improved by placing V- or W-ditches in the lower parts of the soil areas and in the nearby depressions. In many places it is necessary to provide dragline ditches so that the small V- or W-ditches will have adequate outlets. It is important that rows be directed so that excess water will be carried off the surface to suitable outlets. The use of crops that produce a heavy litter is desirable to improve the tilth of the soils.

Capability Class III

Capability class III consists of soils that must have special management to produce desirable yields. The soils of capability class III are in capability units IIIe–1, IIIe–2, IIIe–3, IIIw–1, IIIs–1, and IIIs–2.

Capability unit IIIe–1

The soils in capability unit IIIe–1 are the following:

Dundee silty clay loam, gently sloping phase.
Dundee silty clay loam, sloping phase.
Tunica silty clay, gently sloping phase.

The gently sloping phases of capability unit IIIe–1 have 3 to 7 percent slopes, and the sloping phase has 7 to 10 percent slopes. All the soils occur in long narrow strips, and most of the slopes are short. Because they have comparatively strong slopes, however, the soils are subject to erosion. The Dundee soils are on old natural levees, and the Tunica soil is on slack-water flats. The Dundee soils are somewhat poorly drained to moderately well drained, and the Tunica soil is somewhat poorly drained.

The Dundee soils are medium to strongly acid and are low in organic matter. The Tunica soil is slightly acid to neutral. It has a moderate supply of organic matter. The Dundee soils have fair to good workability, and the Tunica soil has fair to poor workability.

Use and management.—The soils of capability unit IIIe–1 are well suited to cotton. They are moderately well suited to corn, soybeans, small grains, lespedeza,

sericea lespedeza, and alfalfa. Tillage should be on the contour for erosion control, and row crops should be grown only 1 year out of 3. The soils are well suited to permanent pasture, winter grazing, and temporary grazing in summer.

Capability unit IIIe–2

The following soils are in capability unit IIIe–2:

Forestdale silt loam, gently sloping phase.
Forestdale silty clay loam, gently sloping phase.

These gently sloping soils (3 to 7 percent slopes) occur on old natural levees. They are somewhat poorly drained to poorly drained. Internal drainage is slow, and the soils have poor moisture relations for crops. Both the soils are medium to strongly acid and have a low content of organic matter. They are subject to erosion. Their physical condition is fairly good for the maintenance of good tilth. Forestdale silt loam, gently sloping phase, is easy to work. Forestdale silty clay loam, gently sloping phase, is fairly easy to work.

Use and management.—The soils of capability unit IIIe–2 are well suited to grass and hay crops and are fairly well suited to soybeans, small grains, lespedeza, and such deep-rooted legumes as alfalfa, kudzu, and sericea lespedeza. Because these soils are subject to erosion, they are not suitable for continuous cultivation. Close-growing crops or sod crops should be included in the rotation as a protective cover. All tillage should be on the contour. A good rotation would be 1 year of cultivated crops followed by 2 years of close-growing crops or sod crops. Row crops should be followed by winter legumes.

These soils are well suited to pasture, but because they occur in small areas, they are seldom used for that purpose. They are well suited to winter grazing.

Capability unit IIIe–3

The soils in capability unit IIIe–3 are the following:

Alligator clay, gently sloping phase.
Alligator silty clay, gently sloping phase.
Forestdale silty clay, gently sloping phase.
Sharkey clay, gently sloping phase.
Sharkey silty clay, gently sloping phase.
Sharkey-Clack soils, gently sloping phases.

The Alligator and Sharkey soils of capability unit IIIe–3 are on slack-water flats, and the Forestdale soil is on old natural levees. The Sharkey-Clack complex occurs in small areas throughout the slack-water flats, mostly where the elevation changes abruptly from that of the old natural levees to that of the slack-water flats. These soils are gently sloping (3 to 7 percent slopes). The Alligator and Sharkey soils are poorly drained; the Forestdale soil, somewhat poorly drained to poorly drained; and the Clack soil, excessively drained.

The Alligator soils and the Forestdale soil are medium to strongly acid and contain a moderate supply of organic matter. The gently sloping phases of both Sharkey clay and silty clay are medium acid to neutral. The clay soil has a low supply of organic matter, and the silty clay has a moderate supply. Sharkey-Clack soils, gently sloping phases, are strongly acid to neutral and have a variable supply of organic matter.

Use and management.—Because of their heavy surface soils and subsoils, slow to very slow internal drainage, and rather strong slopes, the soils of capability unit IIIe–3 are not suitable for continuous cultivation. The crops to which they are best suited are soybeans, small grains, grass, and hay. They are poorly suited to cotton and corn. If these soils are used for row crops, rotations that include row crops 1 year out of 3 and close-growing crops, legumes, or sod crops, 2 years out of 3 should be used. This rotation will help to improve tilth and maintain or improve the supply of organic matter. In addition, all tillage should be on the contour. These soils occupy narrow strips and are commonly used along with the soils they adjoin.

Capability unit IIIw–1

The following soils are in capability unit IIIw–1:

Dowling soils, overwash phases.
Waverly silt loam, local alluvium phase.

Dowling soils, overwash phases, occur in depressions or former stream channels. Waverly silt loam, local alluvium phase, occurs in depressions. The slopes range from 0 to ½ percent. Both soils are poorly drained.

The Dowling soils are slightly acid to neutral and have a low supply of organic matter. The Waverly soil is medium to strongly acid and contains a moderate amount of organic matter.

Use and management.—The soils of capability unit IIIw–1 are fairly well suited to soybeans and silage crops. Summer annuals for temporary grazing do well. Because water accumulates on these soils and they are poorly drained, most row crops fail to make satisfactory yields. Surface runoff is slow. If the soils are to be used, small V- or W-ditches that have adequate outlets are needed. In some places it is necessary to place dragline ditches in the depressions to provide adequate outlets. Because these narrow strips of soils are intermingled in larger areas of different soils, they are usually planted to the same crops as the soils they adjoin.

Capability unit IIIs-1

Dundee-Clack soils, gently sloping phases (3 to 7 percent slopes) are in capability unit IIIs–1. These soils occur on old natural levees. They are somewhat poorly drained to excessively drained. The soils are medium to strongly acid and are low to very low in organic matter.

Use and management.—The use of the soils in capability unit IIIs–1 depends to a great extent on the proportion of the area occupied by the droughty Clack soils. The proportion is usually low, and the soils can be used in such a manner as to disregard the droughty areas.

This complex is suited to early truck crops, early corn, and small grains. Cotton, corn, and soybeans normally make satisfactory yields, but yields vary because the soils are variable. If row crops are grown, a good rotation would include sod, legumes, or close-growing crops 2 years out of 3. This rotation will help maintain organic matter and control erosion. The preparation for row crops should be done in the spring. These soils are well suited to pasture but are seldom used for that purpose. Because the areas occur as narrow strips, they are commonly farmed along with the soils they adjoin.

Capability unit IIIs-2

The soils in capability unit IIIs–2 are the following:

Alligator clay, nearly level phase.
Alligator silty clay, nearly level phase.
Forestdale silty clay, nearly level phase.
Sharkey clay, nearly level phase.
Sharkey silty clay, nearly level phase.
Sharkey-Clack soils, nearly level phases.

The Alligator and Sharkey soils of capability unit IIIs–2 are on slack-water flats, and the Forestdale soil is on old natural levees. The Sharkey-Clack complex occupies small areas that are distributed throughout the slack-water flats, but it mostly occurs at the places where the elevation changes abruptly from that of the old natural levees to that of the slack-water flats. The soils have slopes that range from ½ to 3 percent.

The Alligator and Forestdale soils are medium to strongly acid. They have a moderate supply of organic matter. Sharkey clay, nearly level phase, and Sharkey silty clay, nearly level phase, are generally medium acid to neutral, although in some places Sharkey clay, nearly level phase, is calcareous in the lower part. The supply of organic matter in these two soils is moderate. The soils in the Sharkey-Clack complex are strongly acid to neutral, and their content of organic matter is variable.

The factor limiting the use of most of these soils is the fine-textured surface soil and subsoil. Because of the clayey subsoil, the movement of water through the profile is slow or very slow. The exceptions are in the small areas of Clack soil included in the Sharkey-Clack complex. This soil is loose loamy sand that has very rapid internal drainage.

Use and management.—The soils of capability unit IIIs–2 are well suited to rice, grass, and hay crops. They are not well suited to cotton and corn but are fairly well suited to small grains, soybeans, and lespedeza. When these soils are used for row crops, at least half of the rotation should consist of close-growing crops, such as sod crops, legumes, or both. Crops that produce a heavy yield of litter will improve the soils.

These nearly level soils have slow surface runoff that can be accelerated by using V-ditches, or dragline ditches. Adequate outlets must be provided in the adjacent depressions before the soils can be put to use. It is important that crop rows be run so as to direct excess water to suitable outlets.

Before permanent pastures can be used for grazing in winter, a good sod is necessary to prevent bogging. These soils are not suitable for temporary grazing, but they may be used for temporary summer grazing of such annuals as millet or sweet sudan.

Inasmuch as a large part of the acreage in the county consists of soils of this capability unit, it is important that the soils be used for purposes to which they are well suited. They are best used for permanent pasture or rice. Rice is a new crop on these soils. Most of the soils produce yields of 60 to 70 bushels per acre for the first year.

Capability Class IV

Capability class IV in this county is made up of soils that for the most part are inherently fertile. Nevertheless, because of certain characteristics and the location, the soils cannot be used in a regular cropping system. One of the most needed practices in managing the soils of this capability class is to choose crops carefully. The soils are in capability units IVw–1, IVw–2, IVw–3, and IVs–1.

Capability unit IVw–1

Alluvial soils, a miscellaneous land type, is the only member of capability unit IVw–1. This land type is made up of soils that have excess water as the dominant hazard. These soils occupy the areas between the Mississippi River and its levee. Because they are subject to periodic overflows of long duration, their use for crop production is very uncertain. Most of the soils consist of different phases of the Commerce and Robinsonville series and of smaller areas of different phases of the Mhoon and Crevasse series.

About 75 percent of this land type is not cultivated because of unfavorable relief or the flood hazard. Some of it was disturbed by excavation when the levee was built. Parts of it are used for temporary grazing, but no permanent pastures have been established. Most of this area is in bottom-land hardwoods, but there are scattered stands of willows and cottonwoods.

Some small areas of this land type occur at higher elevations than typical so are not flooded each year. They may not be flooded for several years. Because of the risk of floods, however, these areas are not planted to crops.

Use and management.—The soils of this land type are very productive, and little fertilizer is used on them. They are suited to limited use for row crops, hay, and grazing. Because of the overflows, crops that can be planted late should be grown. Cotton is grown successfully some years but fails completely in other years. Except for those years when overflows prevent it, corn can be successfully grown, as is true for most row crops.

Permanent pastures are not practical on these soils, and in many places they cannot be established. These areas are often used for summer and fall grazing, but generally the cattle must be removed to protected areas by late fall. Some of the areas at higher elevations may be planted for temporary winter grazing, but this is the exception rather than the rule.

On a long-term basis, this land type is best suited to forest. The use of this land for row crops is uncertain, and for grazing its use can be only temporary.

Capability unit IVw–2

The soils in capability unit IVw–2 are the following:

Alligator clay, level phase.
Alligator silty clay, level phase.
Sharkey clay, level phase.
Sharkey silty clay, level phase.

The level soils of capability unit IVw–2 (0 to ½ percent slopes) are on slack-water flats. These soils are poorly drained. The Alligator soils are medium to strongly acid, and the Sharkey soils are medium acid to neutral. All the soils have a moderate supply of organic matter. Their fine-textured, clayey nature makes management difficult and limits their suitability for use.

Use and management.—The soils of capability unit IVw–2 are well suited to rice. They are fairly well suited to soybeans if proper drainage is provided but are poorly suited to cotton, corn, and small grains.

If these soils are to be used for row crops, a good cropping system would be 2 years of row crops followed by 4 years of sod crops. Because of their poor drainage, an extensive drainage system is necessary before the soils can be used for row crops. Less drainage is needed if they are used for pasture. Permanent pasture is a good use for these soils. The soils are well suited to fescue and Ladino clover and slightly less suited to Dallisgrass and lespedeza.

The soils can be used for summer annuals such as millet and sweet sudan. Temporary winter grazing is not a good use. These soils are well suited to forest, and some areas are used for that purpose.

Capability unit IVw–3

Dowling clay is the only soil in capability unit IVw–3. This soil (0 to ½ percent slopes) occupies depressions or channels of former streams. It is slightly acid to neutral and has a moderate supply of organic matter.

This soil is poorly drained. Water accumulates on it from nearby higher soils. It is likely to be flooded for long periods, especially in fall, winter, and spring, if adequate outlets for water are not provided. Because its surface soil and subsoil are heavy firm clay, this soil is difficult to manage, even though adequate drainage is provided.

Use and management.—The soil of capability unit IVw–3 is not suited to cotton and corn. Where good surface drainage is provided, it is best suited to soybeans, grain sorghum, and hay and silage crops. It can be used for temporary summer grazing of such annuals as millet or sudangrass.

This soil forms part of the natural drainage pattern and, where feasible, should serve as the location for V-ditches, or dragline ditches. It is closely associated with other poorly drained, fine-textured soils. Because the areas are rather narrow, it is generally used in the same manner as the adjoining soils. The exceptions are some relatively large areas of the soil that need entirely different use from that of the adjoining soil. These areas can be used for rice or pasture.

Capability unit IVs–1

The soils in capability unit IVs–1 are the following:

Clack loamy sand, nearly level phase.
Clack sandy loam, nearly level phase.
Crevasse loamy sand.
Crevasse loamy sand, shallow variant.

The soils of capability unit IVs–1 have slopes that range from ½ to 3 percent. The Clack soils are on old natural levees and are medium to strongly acid. The Crevasse soils are on recent natural levees and are neutral to alkaline.

The principal factor limiting the use of these soils is very rapid internal drainage in all except Crevasse loamy sand, shallow variant. This shallow variant has very rapid to medium internal drainage and is not so droughty as the other soils of the group. Irrigation will make the soils of this capability unit suitable for many uses.

Use and management.—The soils of capability unit IVs–1 are not suited to continuous row crops. They can, however, be used for early truck crops. They can also be used for small grains, but a good stand of these crops is usually difficult to obtain in the fall. The soils are not suited to cotton, corn, and soybeans. The use of perennial legumes or sod crops three-fourths of the time will increase their very low supply of organic matter. Nitrogen fertilizer, if used, may leach rapidly below the reach of plant roots.

Deep-rooted perennial grasses are considered the best suited grasses for these soils. Kudzu and sericea lespedeza will grow satisfactorily, but it is difficult to establish them on these droughty soils. Permanent pasture, with limited grazing, is considered the best use for these soils.

Estimated Yields

The estimated average yields of various crops on each of the Bolivar County soils under two levels of management are listed in table 6. In columns A are average yields under management now prevalent in the county. This management does not include using a definite plan of crop rotation; applying fertilizer to all crops (not to cotton alone); and tilling on the contour.

Yields in columns B are those expected under the management practices described under the discussion of each capability unit. The table lists the capability unit of each soil. The management needed to get yields in columns B includes the wise choice and rotation of crops; correct use of fertilizer, lime, and manure; return of organic matter to the soils; proper tillage; and, if needed, methods to control water. The figures in columns B can be considered as production goals that can be attained by using good management practices.

Figures for pasture are given only for column B. They are based on the best available data. Cow-acre-days, used to express the carrying capacity of pasture, is the product of the number of animal units carried per acre multiplied by the number of days during the year that animals can be grazed without injury to the pasture.

One of the first steps in obtaining high yields is to select crops suited to the particular soils, since some management practices and some soils will produce high yields of one crop but only low yields of another. More corn will be produced, for example, on the lighter soils under comparable management than on the heavy clay soils.

Cotton is the principal cash crop in the county. Most farmers, therefore, need to know which of their soils are best suited to cotton. They should choose crops to be grown on the other soils with equal care. Management of a crop may be influenced by its proportionate acreage or by other factors such as the relation to the farm business as a whole.

Figures shown in table 6 are based on:

1. Results of experiments conducted for 3 years on fertilizer test plots on Bosket, Brittain, Dundee, and Sharkey soils.
2. Information received from farmers and agricultural workers.
3. Observation of crops on specific soil types.
4. Results of test plots in adjacent Coahoma and Sunflower Counties on Alligator, Bosket, Dubbs, Dundee, Forestdale, and Sharkey soils.
5. Comparative analysis of yield estimates of soil types in Quitman and Tunica Counties.

TABLE 6.—*Estimated average acre yields of principal crops under two levels of management*

[Yields in columns A are those obtained under common management practices; yields in columns B are those obtained under good management. Lack of information indicates crop is poorly suited at the management level indicated. Pasture is rated for only the B level of management]

Soil	Cotton (lint)		Corn (hybrid)		Oats		Rice		Soybeans		Pasture	Capability unit
	A	B	A	B	A	B	A	B	A	B	B	
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	
Alligator clay:												
Nearly level phase	300	375	25	65	50	60	60	70	15	25	145	IIIs–2.
Level phase	300	375	25	65	50	60	60	70	15	25	145	IVw–2.
Gently sloping phase	300	375	25	65	50	60	60	70	15	25	145	IIIe–3.
Alligator silty clay:												
Nearly level phase	300	375	25	65	50	60	60	70	15	25	145	IIIs–2.
Level phase	300	375	25	65	50	60	60	70	15	25	145	IVw–2.
Gently sloping phase	300	375	25	65	50	60	60	70	15	25	145	IIIe–3.
Alligator silty clay loam, nearly level phase	350	450	25	65	50	60	60	70	15	25	130	IIs–4.
Alluvial soils	------	------	------	------	------	------	------	------	------	------	----------	IVw–1.
Beulah very fine sandy loam, nearly level phase	450	550	30	70	35	45	------	------	10	15	140	IIs–3.
Bosket very fine sandy loam:												
Nearly level phase	600	825	65	100	55	65	------	------	25	35	175	I–1.
Gently sloping phase	600	825	65	100	55	65	------	------	25	35	175	IIe–1.
Brittain silt loam, nearly level phase	450	500	60	90	50	60	60	70	15	25	150	IIs–2.
Clack loamy sand, nearly level phase	------	------	------	------	------	------	------	------	------	------	60	IVs–1.
Clack sandy loam, nearly level phase	------	------	------	------	------	------	------	------	------	------	70	IVs–1.
Commerce silt loam	550	750	60	100	50	60	------	------	25	30	175	I–1.
Commerce silty clay loam	500	600	50	100	60	70	------	------	20	30	160	IIs–1.
Commerce silty clay	450	550	30	70	50	60	------	------	20	30	130	IIs–1.
Commerce-Robinsonville-Crevasse soils	560	660	50	80	45	50	------	------	10	20	140	IIs–3.
Crevasse loamy sand	------	------	------	------	------	------	------	------	------	------	60	IVs–1.
Shallow variant	------	------	------	------	15	20	------	------	------	------	80	IVs–1.
Dexter silt loam:												
Nearly level phase	700	825	65	100	55	65	------	------	25	35	150	I–1.
Gently sloping phase	700	825	65	100	55	65	------	------	25	35	150	IIe–1.
Dowling clay	------	------	10	30	------	------	60	70	10	15	60	IVw–3.
Dowling soils, overwash phases	------	------	10	40	------	------	------	------	10	15	65	IIIw–1.
Dubbs very fine sandy loam:												
Nearly level phase	625	825	65	100	55	65	------	------	25	35	175	I–1.
Gently sloping phase	625	825	65	100	55	65	------	------	25	35	175	IIe–1.
Dundee silt loam:												
Nearly level phase	550	700	60	100	55	65	------	------	25	35	175	I–1.
Gently sloping phase	550	700	60	100	55	65	------	------	25	35	175	IIe–1.
Dundee silty clay, nearly level phase	500	600	50	100	50	60	------	------	20	30	130	IIs–1.
Dundee silty clay loam:												
Nearly level phase	500	600	50	100	55	65	------	------	20	30	150	IIs–1.
Gently sloping phase	500	600	50	100	55	65	------	------	20	30	150	IIIe–1.
Sloping phase	500	600	50	100	55	65	------	------	20	30	150	IIIe–1.
Dundee very fine sandy loam:												
Nearly level phase	550	700	60	100	55	65	------	------	25	35	175	I–1.
Gently sloping phase	550	700	60	100	55	65	------	------	25	35	175	IIe–1.
Dundee-Clack soils:												
Nearly level phases	330	420	35	60	35	40	------	------	15	20	105	IIs–3.
Gently sloping phases	330	420	35	60	35	40	------	------	15	20	105	IIIs–1.
Forestdale silt loam:												
Nearly level phase	425	500	50	80	50	60	60	70	15	25	140	IIs–2.
Gently sloping phase	425	500	50	80	50	60	60	70	15	25	140	IIIe–2.
Forestdale silty clay loam:												
Nearly level phase	350	450	30	65	50	60	60	70	15	25	130	IIs–4.
Gently sloping phase	350	450	30	65	50	60	60	70	15	25	130	IIIe–2.
Forestdale silty clay:												
Nearly level phase	325	400	25	65	50	60	60	70	15	25	145	IIIs–2.
Gently sloping phase	325	400	25	65	50	60	60	70	15	25	145	IIIe–3.
Forestdale soils, nearly level phases	425	500	50	80	50	60	60	70	15	25	140	IIs–2.
Mhoon silt loam	425	500	50	80	50	60	------	------	20	30	140	IIs–2.
Pearson silt loam:												
Nearly level phase	550	700	60	100	55	65	------	------	25	35	150	I–1.
Gently sloping phase	550	700	60	100	55	65	------	------	25	35	150	IIe–1.
Robinsonville fine sandy loam	700	825	65	100	55	65	------	------	15	25	175	I–1.
Sharkey clay:												
Nearly level phase	300	375	25	65	50	60	60	70	15	25	145	IIIs–2.
Level phase	300	375	25	65	50	60	60	70	15	25	145	IVw–2.
Gently sloping phase	300	375	25	65	50	60	60	70	15	25	145	IIIe–3.

See footnote at end of table.

TABLE 6.—*Estimated average acre yields of principal crops under two levels of management*—Continued

[Yields in columns A are those obtained under common management practices; yields in columns B are those obtained under good management. Lack of information indicates crop is poorly suited at the management level indicated. Pasture is rated for only the B level of management]

Soil	Cotton (lint)		Corn (hybrid)		Oats		Rice		Soybeans		Pasture	Capability unit
	A	B	A	B	A	B	A	B	A	B	B	
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	
Sharkey silty clay:												
Nearly level phase	300	375	25	65	50	60	60	70	15	25	145	IIIs–2.
Level phase	300	375	25	65	50	60	60	70	15	25	145	IVw–2.
Gently sloping phase	300	375	25	65	50	60	60	70	15	25	145	IIIe–3.
Sharkey silty clay loam, nearly level overwash phase	350	450	25	65	50	65	60	70	15	25	130	IIs–4.
Sharkey very fine sandy loam, nearly level overwash phase	500	525	50	80	50	65	60	70	15	25	140	IIs–2.
Sharkey-Clack soils:												
Nearly level phases	210	265	20	45	35	40	40	50	10	20	100	IIIs–2.
Gently sloping phases	210	265	20	45	35	40	40	50	10	20	100	IIIe–3.
Souva soils	350	500	30	90	20	30	------	------	15	25	100	IIw–1.
Tunica silty clay:												
Nearly level phase	500	550	30	70	50	60	------	------	15	30	160	IIs–1.
Gently sloping phase	500	550	30	70	50	60	------	------	15	30	160	IIIe–1.
Waverly silt loam, local alluvium phase	------	------	10	30	------	------	------	------	10	15	90	IIIw–1.

[1] Cow-acre-days is a term used to express the carrying capacity of pasture. It is the number of days a year that 1 animal unit can be supported on 1 acre without injury to the pasture. An animal unit is the equivalent of 1 mature cow, steer, or horse; 5 hogs; or 7 sheep or goats.

These figures are estimates only, based on the best information available. Yields may be above or below the figures listed in the table. The yields should be used only as a guide in the preparation of farm plans or in appraisals. Results from 1 year's crop can be misleading; therefore, the figures were based on information received over a period of years. A favorable or unfavorable season, the past treatment of a soil, the type of crop, the skill of the operator, and other factors will greatly affect yields.

Genesis, Morphology, and Classification of Soils

In this section are discussed the factors of soil formation, the morphology and composition of the soils of Bolivar County, and the classification of the soils into higher categories.

Factors of Soil Formation

Soil results from the interaction of soil-forming processes on materials deposited or accumulated by geologic action. The characteristics of the soil at any given point are determined by (1) the climate under which the soil material has accumulated and existed since it accumulated; (2) the plant and animal life in and on the soil; (3) the type of parent material; (4) the topography; and (5) the length of time the forces of soil development have acted on the soil materials.

One of the five factors may have more influence than others on the development of the soil and may be responsible for fixing most of its properties. For example, if the parent material of the soil is quartz sand, the soil generally has only weakly developed horizons. Even in quartz sand, however, distinct profiles can be formed under certain types of vegetation where the topography is low and level and the water table is high. As a rule, however, more than 1 of the 5 factors influence the development of the soil.

Climate

Bolivar County has the humid, warm-temperate, continental climate characteristic of the southeastern United States. Average temperatures and rainfall distribution by months are given in table 1, p. 2. The climate is so uniform throughout the county that it has made only a slight impression on the soils.

As a rule, areas that have humid, warm-temperate climates have strongly weathered, leached, acid soils of low fertility. The flood plain of the Mississippi River, however, is geologically young. Time has not permitted strong weathering of the sediments in place. The sediments from which the soils were derived have come in large part from areas in which weathering is not intense. Thus, the kinds of soil normally associated with humid, warm-temperate climates do not occur in Bolivar County, though they occur in areas within short distances to the east and west. The soils resemble those that commonly occur in cooler and slightly drier climates.

Living organisms

Before the county was settled, the native vegetation was the most important factor that affected the development of the soils. Animals apparently had much less effect upon the soil development than vegetation.

When the first settlers arrived, they found that dense forests, broken by occasional canebrakes, covered the area. Heavy stands of cypress grew in the swampy areas, and hardwoods occupied most of the better drained soils and many of the wet ones. On the low ridges the trees were principally hickory, pecan, post oak, blackgum, and winged-elm. In the swales and low places that were wet, but not swampy, the principal trees were tupelo-gum, sweetgum, soft elm, green ash, hackberry, cottonwood, overcup oak, and willow oak. Canebrakes covered many of the broader flats in the sloughs and bayous between the swamps.

The differences in native vegetation apparently were caused largely by differences in drainage. Only the major differences in the original vegetation have been reflected in the soils to any extent, however, probably because the soils are so young.

Man has had his effect upon the vegetation. He has cleared the forests, cultivated the soils, introduced new species of plants, built levees for flood protection, and improved drainage. All of these will influence the future development of the soils. Few results of these changes can as yet be seen, and some may not be evident for many centuries.

Parent materials

Most of the soils of Bolivar County were derived from alluvial sediments laid down by the Mississippi River. A small acreage originated from alluvial sediments carried by tributary streams from the loess hills, which are about 25 miles to the east. The thickness of the alluvium in this county ranges from many tens to several hundreds of feet.

The alluvium along the lower Mississippi River, including this county, came from many different soils, rocks, and unconsolidated sediments that originated in some 20 States. As a result it consists of a mixture of mineral materials, many of which are comparatively fresh and but slightly weathered. Sedimentary rocks are the most extensive of the rocks in the upper basin, which extends from Montana to Pennsylvania, but other kinds of rock are also exposed and serve as sources of sediment in many places. Large areas in the upper basin have a mantle of recent glacial drift and loess.

Within the county the texture varies greatly because of differences in deposition. All of the material was laid down by river waters either when the river was quiet or in flood. As the river overflowed its channel and the water spread out over the flood plain, the coarser sediments were dropped first. Sands were commonly deposited in bands parallel to and near the channel. Low ridges thus formed are known as natural levees.

As the floodwaters continued to spread, they moved more slowly and fine sediments, such as silt, were deposited next. Generally the silt was mixed with some sand and clay. When the flood had passed and water was left standing in the lowest part of the flood plain, the finest sediments, or clays, settled out. These so-called slack-water clays did not settle until the water became still.

The simple pattern of coarse sediments near the channel, fine sediments in slack-water areas some distance away, and medium-textured sediments between the two is not common at the present time along the Mississippi River. Over the centuries the river channel has meandered back and forth across much of the flood plain, sometimes cutting out natural levees laid down earlier, sometimes depositing sand on top of slack-water clays or vice versa. The original pattern in which the sediments were distributed from a single channel has become partly or wholly truncated in many places. In many places subsequent beds of alluvium have covered the original pattern.

Many combinations of sediments resulting from the superimposing of the simple patterns are now present in the flood plain. In many places there are fragments of former channels with their adjacent sandy natural levees, very gently sloping areas of medium-textured sediments, and slack-water clays. On the whole, the large areas of slack-water clays have been stable, partly because they lie farthest from the meander belt established by the river channel in the central part of the broad flood plain.

Textural differences in the alluvium are accompanied by some differences in the chemical and mineralogical composition of the soils. The sandier sediments generally contain more quartz than sediments of intermediate or fine textures. Conversely, they contain less feldspar and ferromagnesian minerals. The sandier sediments are characteristically more siliceous and lower in bases. For the most part, they are also lower in carbonates. Some of the more recently deposited sandier levees are distinctly calcareous, whereas many of the slack-water sediments are free of carbonates and are slightly acid.

Topography

Bolivar County is a small part of a large nearly level flood plain. The topography ranges from level in the flat areas of slack-water clays to very gently undulating in the successions of ridges and swales that once bordered the river channel.

Local differences in elevation in the county are commonly measurable in feet. Seldom are there differences as great as 15 feet within 1 square mile. In some of the lowest and flattest parts of the flood plain, elevation varies less than 5 feet in as many square miles. Slopes are generally less than 3 percent. Stronger slopes of as much as 10 percent occur on a few streambanks and on the present natural levees of the Mississippi River. The total area in which slopes are strong in the county is negligible. The prevailing elevation above sea level is between 100 and 165 feet.

The level relief in the county contributes to the slow drainage of many of the soils. Water moves into the main channels with difficulty, especially from the areas of slack-water clays. Movement of water through the slack-water clays is also slow, which tends to accentuate drainage problems. A much larger part of the county would probably have been wet and swampy if in the past the Mississippi River had not meandered so much across the flood plain.

Time

Geologically, the soils of this county are young. Even now some areas receive fresh sediments at frequent intervals. Most of the county was receiving occasional deposits until the levee was built in 1859 (*4*).

It is probable that the sediments from which the soils in Bolivar County originated were deposited during and after the advance of the Wisconsin glaciers, the latest of

which was moving into the area that is now the North Central States about 11,000 years ago (*1*).

The soils that are forming on glacial drift of the Mankato stage (the last of the Wisconsin glaciers) in the North Central States show little difference between horizons other than that brought about by the downward leaching of carbonates and the accumulation of organic matter in the surface layer. The present surface of the Mankato drift has probably been exposed for 8,000 years. Assuming rates of horizon differentiation in the alluvium of Bolivar County to be as rapid as that of the Mankato drift, the soils could be somewhat older than those of south-central Minnesota. Even so, the comparison indicates that the time span for the development of horizons in the soils of Bolivar County has been short.

Morphology and Composition

Soil morphology in Bolivar County is expressed generally in faint horizons. Some of the soils do have one distinct or prominent horizon, but these are in the minority. None of the soils has prominent horizons within the solum. Marked differences in texture between the solum or the C horizon and an underlying D horizon occur in some profiles, as, for example, in the Tunica soils, which were formed from thin beds of clay over sand. Generally speaking, the soils are in the early stages of horizon differentiation, or it has scarcely started, and the horizons themselves are indistinct.

The differentiation of horizons in the soils of the county is the result of one or more of the following processes: (1) Accumulation of organic matter, (2) leaching of carbonates and salts more soluble than calcium carbonate, (3) translocation of silicate clay minerals, and (4) reduction and transfer of iron. In most soil profiles in the county, two or more of these processes have operated in the development of horizons. For example, the first two are reflected in the feeble horizons of Crevasse loamy sand, whereas the first and last are chiefly responsible for the morphology of Sharkey clay. All four processes have operated to some extent in the differentiation of horizons in the Dundee soils.

In the uppermost layer of all but a few soils in Bolivar County, some organic matter has accumulated to form an A_1 horizon. Much of that organic matter is in the form of humus. The quantities are small in some soils but fairly large in others. Soils such as the Clack loamy sands have faint thin A_1 horizons low in organic matter at best. Some areas of this soil lack any A_1 horizon. Other soils, such as the Sharkey clays, have evident, thick A_1 horizons fairly high in organic matter. Taking the soils of the county as a whole, the accumulation of organic matter has been most important among processes of horizon differentiation.

Leaching of carbonates and salts has occurred in all of the soils of the county, although it has been of limited importance to horizon differentiation. The effects have been indirect, in that the leaching permitted the subsequent translocation of silicate clay minerals in some soils. Carbonates and salts have been carried completely out of the profiles of most of the well-drained soils. Even in the wettest soils, some leaching is indicated by the absence of carbonates and by the acid reactions. Leaching of the very wet soils is slow because water movement through the profile is itself slow. Leaching has also made little progress in the removal of carbonates from soils forming on the most recent sediments near the channel of the Mississippi River. Carbonates and other salts have been washed out of the profiles of most of the soils in Bolivar County.

The translocation of silicate clay minerals has contributed to the development of horizons in only a few soils in the county, mainly in soils of the Bosket, Dubbs, and Dundee series. Darker coatings on ped faces and clay films in former root channels in the B horizon of these soils indicate some downward movement of silicate clay minerals from the A horizons. The actual amount of clay movement has been small, but it has contributed to horizon differentiation. In the Bosket, Dubbs, and Dundee soils, translocation of clay has been about as important as the accumulation of organic matter in horizon differentiation. Leaching of carbonates and salts from the upper profile seems to be a necessary prelude to the movement of the silicate clays.

The reduction and transfer of iron has occurred in all the poorly drained and somewhat poorly drained soils. It has also occurred to some extent in the deeper horizons of moderately well drained soils, such as the Dundee very fine sandy loams. In the large areas of naturally wet soils in Bolivar County, the reduction and transfer of iron, a process often called gleying, has been important in horizon differentiation.

The gray colors of the deeper horizons of the wet soils indicate the reduction of iron oxides. This reduction is commonly accompanied by some transfer of the iron, which may be local or general in character. After it has been reduced, iron may be removed completely from some horizons and may even go out of the soil profile. More commonly in Bolivar County, it has moved a short distance and stopped either in the horizon of its origin or in a nearby horizon. Iron has been segregated within deeper horizons of many of the soils to form yellowish-red, strong-brown, or yellowish-brown mottles. Iron has also been segregated into concretions in deeper profiles of some soils.

The differentiation of the A_1 horizon from the deeper ones in poorly drained soils of Bolivar County is caused in part by the reduction and transfer of iron. Horizon differences also result in part from a greater accumulation of organic matter in the surface layer. The effects of gleying—the reduction and transfer of iron—are generally evident, but not prominent, in the profiles of the soils in Bolivar County. This seems to reflect the youth of the land surface and of the soils. The time during which the sediments have been subject to horizon differentiation has not yet been long enough to permit the development of prominent horizons in the soil profiles.

Classification of Soils by Higher Categories

Soils are placed into narrow classes to organize and apply knowledge about their behavior within farms or counties. They are placed into broad classes for study and comparison of large areas such as continents. In the comprehensive system of soil classification followed by the United States (*9*), the soils are placed into classes in six categories, one above the other. Beginning at the

top, the six categories are the order, suborder, great soil group, family, series, and type.

In the highest category the soils of the whole country are grouped into three orders, whereas thousands of soil types are recognized in the lowest category. The suborder and family categories have never been fully developed and thus have been little used. Attention has largely been given to the classification of soils into soil types and series within counties or comparable areas and to the subsequent grouping of series into great soil groups and orders. The nature of the soil series and soil type is discussed in an earlier section, How a Soil Survey is Made. Subdivisions of soil types into phases so as to provide finer distinctions significant to soil use and management are also discussed in the same earlier section.

Classes in the highest category of the classification scheme are the zonal, intrazonal, and azonal orders (*9*). The zonal order is comprised of soils with evident, genetically related horizons that reflect the predominant influence of climate and living organisms in their formation. The intrazonal order is comprised of soils with evident, genetically related horizons that reflect the dominant influence of a local factor of topography, parent materials, or time over the effects of climate and living organisms. The azonal order is comprised of soils that lack distinct, genetically related horizons, commonly because of youth, resistant parent material, or steep topography.

The great soil groups in the county are: (1) Gray-Brown Podzolic soils, (2) Low-Humic Gley soils, (3) Grumusols, and (4) Alluvial soils. This classification is incomplete and is subject to revision as knowledge about the soil series and their relations increases. The orders and great soil groups and the parent material, relief, degree of profile development, and contrast between

TABLE 7.—*Classification of the soil series by higher categories and some of the factors that have contributed to their morphology*

Great soil group and series	Parent material	Relief	Degree of profile development	Contrast between horizons
ZONAL				
Gray-Brown Podzolic:				
Beulah	Medium to moderately coarse textured alluvium.	Nearly level	Weak	Weak.
Bosket	Medium, moderately fine, and coarse-textured alluvium.	Nearly level to gently sloping; dominant, nearly level.	Weak	Medium.
Dexter	Silty alluvium	Nearly level to gently sloping; dominant, nearly level.	Strong	Medium.
Dubbs	Moderately coarse textured to fine textured alluvium.	Nearly level to gently sloping; dominant, nearly level.	Medium	Medium.
Dundee	Moderately coarse textured to fine textured alluvium.	Nearly level to sloping; dominant, nearly level.	Medium	Strong.
Pearson	Silty alluvium	Nearly level to gently sloping; dominant, nearly level.	Medium	Medium.
INTRAZONAL				
Low-Humic Gley:				
Alligator	Fine-textured alluvium	Nearly level to gently sloping; dominant, nearly level.	Weak	Weak.
Brittain	Silty alluvium	Nearly level	Medium	Medium.
Dowling	Fine-textured alluvium	Level	Weak	Weak.
Forestdale	Moderately coarse, medium, and fine-textured alluvium.	Nearly level to gently sloping; dominant, nearly level.	Weak	Weak.
Mhoon	Moderately coarse textured to fine textured alluvium.	Nearly level	Weak	Weak.
Souva	Medium textured and moderately fine textured alluvium.	Level	Weak	Weak.
Waverly	Silty alluvium	Level	Weak	Weak.
Grumusols:				
Sharkey	Fine-textured alluvium	Nearly level to gently sloping; dominant, nearly level.	Weak	Medium.
AZONAL				
Alluvial soils:				
Clack	Coarse-textured alluvium	Nearly level	Very weak	Very weak.
Commerce	Fine to moderately coarse textured alluvium.	Nearly level	Weak	Weak.
Crevasse	Coarse-textured alluvium	Nearly level	Very weak	Very weak.
Robinsonville	Moderately coarse textured and medium textured alluvium.	Nearly level	Weak	Weak.
Tunica	Fine to moderately fine textured alluvium.	Nearly level to gently sloping; dominant, nearly level.	Weak	Weak.

profile horizons of each series are given in table 7. The degree of profile development may be considered as indicating the factor of time in soil development.

Gray-Brown Podzolic soils

Gray-Brown Podzolic soils belong to the zonal order. These soils have a rather thin organic covering and organic-mineral layers that overlie a grayish-brown leached A horizon. The A horizon rests upon an illuvial B horizon.

These soils have developed under deciduous forest in a temperate, moist climate. They have a surface covering of leaf litter, generally from deciduous trees, a dark thin mild (only slightly or moderately acid) humus, somewhat mixed with mineral soil; a grayish-brown, crumb-structured loamy A_1 horizon; and a moderately heavy, blocky structured yellowish-brown, brown, brownish-yellow, or reddish-brown B horizon that becomes lighter colored with depth. The total depth of the solum varies considerably but seldom exceeds 4 feet (*9*). Podzolization is the chief process in the development of these soils (*3*).

Soils of the county that have the characteristics common to Gray-Brown Podzolic soils belong to the following series:

Beulah.	Dubbs.
Bosket.	Dundee.
Dexter.	Pearson.

Except for the Dexter, all the series are barely within the profile development of zonal soils and are considered to be intergrades to the intrazonal or azonal soils.

The Bosket, Dubbs, and Dundee series are tentatively classified in the Gray-Brown Podzolic group, although there is evidence for placing them in the Prairie group.

The Prairie soils have thick, dark grayish-brown to very dark brown A_1 horizons grading to brownish B horizons that in places are mottled. The B horizons, in turn, grade to lighter colored and, in most places, coarser textured C horizons. Both great soil groups normally occur under humid cool-temperate climates, the former under deciduous forest (*3*) and the latter under tall prairie grasses.

The Bosket, Dubbs, and Dundee soils lack distinct A_2 horizons, but all areas of the soils have been disturbed by cultivation. Consequently, it seems highly probable that the plow layer now includes former thin A_1 and A_2 horizons. The soils clearly lack thick, dark A_1 horizons and do not appear to have had them in the past.

The present character of the B horizon, using the Dubbs profile as an example, would permit classification of the soils in either of the two great soil groups. The apparent absence of a thick A_1 horizon, as well as the probability that the A_1 and A_2 horizons have been mixed by plowing, is used as a basis for placing the soils in the Gray-Brown Podzolic group. It should be recognized, however, that the soils consist of intergrades to the Prairie soils and are almost as much like them as they are like the central members of the Gray-Brown Podzolic group.

BEULAH SERIES

The only soil of the Beulah series in this county is Beulah very fine sandy loam, nearly level phase. This soil is somewhat excessively drained and has weak profile development. It has formed from medium textured to moderately coarse textured Mississippi River alluvium. It occurs on old natural levees that border former channels of the Mississippi River and smaller streams on the flood plain.

The Beulah soil is closely associated with soils of the Bosket series. It differs from them chiefly in having a generally coarser texture. The soil occurs in small areas at rather high elevations. It is medium to slightly acid. In profile development it grades toward soils of the Alluvial great soil group.

A profile of Beulah very fine sandy loam, nearly level phase, follows:

A_p 0 to 8 inches, light brownish-gray (10YR 6/2) friable very fine sandy loam; weak fine granular structure.
B 8 to 30 inches, light yellowish-brown (10YR 6/4) very friable fine sandy loam; structureless (single grain).
C 30 to 42 inches, light yellowish-brown (10YR 6/4) very friable sandy loam; structureless (single grain).

BOSKET SERIES

The Bosket series is made up of well-drained soils that have weak profile development. The soils have formed from moderately fine textured, medium textured, and coarse textured Mississippi River alluvium. They occur on old natural levees that border former channels of the Mississippi River and along smaller streams on the flood plain. They resemble the Dubbs soils, with which they are closely associated, but their parent material is generally coarser textured alluvium, and their profile not so strongly developed. The soils are medium to slightly acid. Although the Bosket soils are considered intergrades to the Prairie soils, in some areas they may be considered as intergrades to the Alluvial soils.

A profile of Bosket very fine sandy loam, nearly level phase, follows:

A_p 0 to 8 inches, light brownish-gray (10YR 6/2) very friable very fine sandy loam; weak fine granular structure.
B_2 8 to 24 inches, dark-brown to brown (10YR 4/3 or 5/3) friable sandy clay loam; nonplastic when wet, and slightly hard when dry; weak medium to fine blocky structure.
D 24 to 36 inches, yellowish-brown (10YR 5/4) friable sandy loam.

DEXTER SERIES

The soils of the Dexter series have formed from silty alluvium washed from loessal hills. They occur on old natural levees. In color, texture, and chemical analysis, these soils differ greatly from corresponding soils formed from Mississippi River alluvium. They are better drained than the Brittain and Pearson soils that have formed from similar silty alluvium. The Dexter and Pearson soils are closely associated. They are medium to slightly acid.

A profile of Dexter silt loam, nearly level phase, follows:

A_p 0 to 5 inches, very pale brown (10YR 7/3) very friable silt loam; weak fine granular structure.
B_1 5 to 13 inches, dark-brown (10YR 4/3) friable to firm silty clay loam; weak medium subangular blocky structure.
B_2 13 to 46 inches, yellowish-brown (10YR 5/4) friable to firm silty clay loam; weak medium subangular blocky structure.
D_1 46 to 50 inches, yellowish-brown (10YR 5/4) friable very fine sandy loam.
D_2 50 to 60 inches, yellowish-brown (10YR 5/4) friable fine sandy loam.

DUBBS SERIES

The Dubbs series consists of moderately well drained to well drained soils that have a medium degree of profile

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development. These soils have formed on stratified beds of moderately coarse to fine textured Mississippi River alluvium. They occur on old natural levees that border former channels of the Mississippi River and along smaller streams on the flood plain.

The Dubbs soils are better drained than the Dundee and Forestdale soils of the old natural levees. Unlike the Dundee soils, they are free of mottling. They occur at slightly higher elevations than the Dundee soils and generally have better natural drainage. The soils differ from the Forestdale soils in having shades of brown as the predominant color. They also occur at higher elevations and have better natural drainage than the Forestdale soils. The soils are slightly to strongly acid. In some areas they intergrade to the Alluvial great soil group.

A description of Dubbs very fine sandy loam, nearly level phase, follows:

A_p 0 to 8 inches, grayish-brown (10YR 5/2) friable very fine sandy loam; weak fine granular structure.
B_1 8 to 20 inches, yellowish-brown (10YR 5/4) firm silty clay loam; weak medium blocky structure.
B_2 20 to 36 inches, dark yellowish-brown (10YR 4/4) friable fine sandy loam; weak medium subangular blocky structure.
D 36 to 50 inches, yellowish-brown (10YR 5/8) very friable loamy sand.

DUNDEE SERIES

The Dundee soils are somewhat poorly drained to moderately well drained. They have formed on stratified beds of moderately coarse textured to fine textured Mississippi River alluvium. These soils occur on old natural levees that border former channels of the Mississippi River and small streams on the flood plain. They are intermediate in drainage between the Dubbs and Forestdale soils of the old natural levees. The Dundee soils are medium acid to strongly acid. They are intergrades to the Prairie soils, but in some areas they are considered intergrades to soils of the Low-Humic Gley great soil group.

A profile of Dundee silt loam, nearly level phase, follows:

A_p 0 to 6 inches, light brownish-gray (10YR 6/2) friable silt loam; weak fine granular structure.
B_2 6 to 26 inches, light yellowish-brown (10YR 6/4) firm silty clay; faint medium mottles or splotches of shades of gray and yellow common; plastic when wet, and hard when dry; moderate medium blocky structure.
D 26 to 36 inches, grayish-brown (10YR 5/2) firm silty clay loam; distinct medium mottles of shades of yellow and brown are common.

PEARSON SERIES

The soils of the Pearson series have formed from silty alluvium that washed from the loess hills. They occur on old natural levees. In color, texture, and chemical analysis, these soils differ greatly from the soils on old natural levees that have developed from general alluvium deposited by the Mississippi River.

These soils are intermediate in drainage between those of the Brittain and Dexter series that have developed from silty alluvium on old natural levees. They are browner throughout than the Brittain soil. They occur at slightly higher elevations and have better natural drainage. They are lighter colored throughout than the Dexter soils, occur at slightly lower elevations, and are more poorly drained.

The Pearson soils differ from the Dundee soils in having a more uniform color, weaker contrast between profile horizons, and more silt throughout the profile. They are strongly to slightly acid. In profile development they grade toward soils of the Low-Humic Gley great soil group.

The following is a description of Pearson silt loam, nearly level phase:

A_p 0 to 5 inches, very pale brown (10YR 7/3) very friable silt loam; weak fine granular structure.
A_2 5 to 9 inches, very pale brown (10YR 7/3) very friable silt loam; a few, faint, fine, light-gray (10YR 7/2) mottles; structureless (massive).
A_3 9 to 15 inches, yellowish-brown (10YR 5/6) friable silt loam mottled with light gray (10YR 7/2); weak medium subangular blocky structure.
B_1 15 to 22 inches, yellowish-brown (10YR 5/4) friable silt loam mottled with light gray (10YR 7/2); weak medium subangular blocky structure.
B_2 22 to 26 inches, dark yellowish-brown (10YR 4/4) friable to firm silty clay loam mottled with light brownish gray (10YR 6/2); moderate medium subangular blocky structure.
D_1 26 to 35 inches, grayish-brown (10YR 5/2) friable to firm silty clay loam splotched with dark brown (10YR 4/3); weak medium subangular blocky structure.
D_2 35 to 50 inches, grayish-brown (10YR 5/2) firm silty clay loam mottled with yellowish brown (10YR 5/4) and light grayish brown (10YR 6/2); weak medium subangular blocky structure.
D_3 50 to 68 inches, yellowish-brown (10YR 5/4) firm silty clay; a few, faint, fine, light brownish-gray (10YR 6/2) mottles; weak medium subangular blocky structure.
D_4 68 inches +, brown (10YR 5/3) friable very fine sandy loam; a few, faint, fine, gray (10YR 5/1) mottles; structureless (single grain).

Low-Humic Gley soils

The Low-Humic Gley great soil group consists of imperfectly to poorly drained soils that have very thin surface horizons moderately high in organic matter. These overlie mottled gray and brown gleylike mineral horizons (*9*). Gleying has been the process important in their development.

In this county the Low-Humic Gley soils include members of the following series:

Alligator.
Brittain.
Dowling.
Forestdale.
Mhoon.
Souva.
Waverly.

Except for the Souva soils, all these soils are either poorly drained or somewhat poorly drained. The Souva soils in this county are moderately well drained to somewhat poorly drained.

None of the soils appear to have distinct horizons, although they show the effects of gleying and accumulation of organic matter in their morphology. These soils either are members of or are closely related to hydromorphic groups. The absence of a thick A_1 horizon high in organic matter is used as a basis for excluding these series from the Humic Gley group (*8*). The soils therefore seem more appropriately classified as Low-Humic Gley soils.

The Sharkey soils were once considered members of the Low-Humic Gley great soil group. The soils exhibit properties of churning through shrinking, swelling, and cracking. They are therefore tentatively classified as Grumusols (*5*).

Recognition of the Low-Humic Gley group was proposed initially for somewhat poorly drained to poorly drained soils that lack prominent A_1 horizons but that have strongly gleyed B and C horizons with little textural differentiation. The recognition of two great soil groups for the Low-Humic Gley and Humic Gley (Wiesenboden) soils was based on the thickness of the A horizon and on the content of organic matter.

The Humic Gley soils are high in organic matter, whereas the Low-Humic Gley soils are moderate to low. The Alligator, Dowling, and Forestdale, and other soils of this group are not high in organic matter, and they show effects of gleying in their morphology. Beyond that, there is less evidence of cracking and churning in these soils than in Sharkey clay. On the basis of present knowledge, classification of the seven series as Low-Humic Gley soils seems appropriate. Further studies may indicate that the Alligator and Dowling soils are intergrades to the Grumusols because both are closely related to the Sharkey soils.

ALLIGATOR SERIES

The Alligator series consists of clayey soils formed from fine-textured Mississippi River alluvium. These poorly drained soils are closely associated with the Sharkey and Tunica soils, which they resemble in many ways. The Alligator and Sharkey soils generally occupy large areas on the slack-water flats. The Alligator soils are lighter colored and more acid than the Sharkey soils, and their structure is not so well developed.

The Alligator soils are generally gray (10YR 5/1 or 6/1) or light brownish gray (10YR 6/2). In contrast the Sharkey soils in most places are dark grayish brown (10YR 4/2) or very dark gray (10YR 3/1). The Alligator soils differ from the Forestdale soils mainly in that their profiles are heavy clay or silty clay throughout, whereas those of the Forestdale soils are silty clay loam in the lower part. The Alligator soils are medium to strongly acid.

A profile of Alligator clay, nearly level phase, follows:

A_{pg} 0 to 6 inches, light brownish-gray (10YR 6/2) firm clay; very plastic when wet, and very hard when dry; weak fine to medium granular structure.

G_1 6 to 24 inches, gray (10YR 5/1) firm to very firm clay mottled with yellowish brown (10YR 5/6); very plastic when wet, and very hard when dry; structureless (massive).

G_2 24 to 36 inches, light-gray (10YR 6/1) firm to very firm clay mottled with various shades of gray, brown, and yellow; structureless (massive).

BRITTAIN SERIES

Brittain silt loam, nearly level phase, the only soil of this series mapped in this county, is somewhat poorly drained. It has formed on old natural levees from silty alluvium derived from the loess hills. It occurs at lower elevations next to the Jones and Porter Bayous. In most places a narrow area of either Dexter or Pearson soils lies between the bayous and the Brittain soil.

This soil is grayer throughout than the Dexter and Pearson soils with which it is associated. It is more poorly drained and generally occurs at lower elevations than the Dexter and Pearson soils. This soil has a higher content of silt in the surface soil and subsoil than the Forestdale soils. It is medium to slightly acid. In characteristics it grades towards soils of the Gray-Brown Podzolic great soil group.

A profile of Brittain silt loam, nearly level phase, follows:

A_p 0 to 4 inches, dark grayish-brown (10YR 4/2) very friable silt loam; weak fine granular structure.

B_g 4 to 10 inches, gray to grayish-brown (10YR 5/1 or 5/2) friable silt loam, mottled with shades of brown and yellow; structureless (massive).

D_G 10 to 40 inches, gray (10YR 5/1) to light-gray (10YR 7/1) friable silty clay loam mottled with shades of yellow and brown; weak medium to coarse subangular blocky structure.

DOWLING SERIES

The soils of the Dowling series are poorly drained. They were formed from fine-textured Mississippi River alluvium. These soils occupy depressions or old bayous or stream meanders. They form a natural drainage pattern for the areas in which they occur. Because they receive runoff from the surrounding slopes, they remain wet longer than most of the soils and are usually covered by water during part of the year. They commonly occur in areas where the Alligator, Forestdale, Mhoon, Sharkey, and Tunica soils predominate. The soils are slightly acid to neutral.

A profile of Dowling clay follows:

A_{pg} 0 to 4 inches, dark-gray (10YR 4/1) firm clay; plastic when wet, and hard when dry; weak medium to fine granular structure. In some places this horizon may be stained almost black with organic matter.

G_1 4 to 24 inches, gray (10YR 5/1) firm clay faintly mottled with shades of brown; plastic when wet, and very hard when dry; structureless (massive).

G_2 24 to 40 inches, gray (10YR 5/1) firm clay faintly mottled with various shades of brown; very plastic when wet, and very hard when dry; structureless (massive).

FORESTDALE SERIES

The soils of the Forestdale series are somewhat poorly drained to poorly drained. Their profiles are weakly developed. These soils have formed from stratified moderately coarse textured, medium textured, and fine textured Mississippi River alluvium. They occupy old natural levees that border former channels of the Mississippi River, small bayous, and other streams. The Forestdale soils have a grayer color throughout than the Dundee soils. In most places they are more poorly drained and occur at lower elevations. They are medium to strongly acid.

A profile of Forestdale silt loam, nearly level phase, follows:

A_{pg} 0 to 6 inches, light brownish-gray (10YR 6/2) friable silt loam; weak fine granular structure.

B_g 6 to 24 inches, grayish-brown (10YR 5/2) firm silty clay mottled with shades of gray and brown; very plastic when wet, and hard when dry; weak medium blocky structure.

D_g 24 to 34 inches, light-gray to gray (10YR 7/1 or 6/1) firm silty clay loam mottled with various shades of yellow and brown; structureless (massive).

MHOON SERIES

Mhoon silt loam, the only soil of this series mapped in Bolivar County, has formed from moderately coarse textured to fine textured Mississippi River alluvium. It occupies small areas on recent natural levees that lie along the river or along former channels of the river. The soil is more poorly drained than the other soils on recent natural levees. It is neutral to alkaline in reaction. In profile development it grades toward soils of the Alluvial great soil group.

A profile of Mhoon silt loam follows:

A_p 0 to 6 inches, pale-brown (10YR 6/3) friable silt loam; weak fine granular structure.
C_{g1} 6 to 14 inches, light-gray (10YR 7/2) friable silt loam mottled with shades of yellow and other shades of gray; weak fine granular structure.
C_{g2} 14 to 24 inches, light-gray (10YR 7/1) friable silty clay loam mottled with brown and other shades of gray; structureless (massive).
C_{g3} 24 to 36 inches, mottled gray (10YR 6/1), yellow (10YR 7/6), and brown (10YR 5/3) firm silty clay loam; structureless (massive).

SOUVA SERIES

The soils of the Souva series are moderately well drained to somewhat poorly drained. They occur in depressions and abandoned stream channels on the Mississippi River flood plain. They were derived, in large part, from local alluvium washed from the Bosket, Dubbs, and Dundee soils. In the upper part of the profile the soils are medium acid to neutral; in the lower part, they are medium acid to slightly acid. The Souva soils grade toward soils of the Alluvial great soil group in profile development.

A profile of a Souva soil follows:

A_p 0 to 6 inches, grayish-brown friable silty clay loam; weak fine granular structure; medium acid to neutral.
C_{g1} 6 to 20 inches, gray friable to firm silty clay loam mottled with shades of brown and yellow; structureless (massive); medium acid to neutral.
C_{g2} 20 to 36 inches, gray firm silty clay mottled with shades of yellow and brown; structureless (massive); medium acid to slightly acid.

WAVERLY SERIES

Only one soil of the Waverly series, Waverly silt loam, local alluvium phase, is mapped in Bolivar County. This soil is poorly drained and is mottled throughout. It has formed from silty alluvium washed chiefly from the Brittain, Dexter, and Pearson soils of the flood plain. It occurs in depressions in the Mississippi River alluvial plain. This soil is medium to strongly acid.

A profile of Waverly silt loam, local alluvium phase, follows:

A_{pg} 0 to 6 inches, pale-brown (10YR 6/3) to grayish-brown (10YR 5/2) friable silt loam mottled with shades of yellow and other shades of brown; weak fine granular structure; small dark-colored concretions are common.
G_1 6 to 20 inches, light-gray to grayish-brown friable silty clay loam mottled with shades of yellow and other shades of brown; structureless (massive).
G_2 20 to 24 inches, light-gray friable to firm silty clay mottled with shades of yellow and red; structureless (massive).

Grumusols

Recognition of Grumusols was proposed (*5*) for a group of soils dominated by montmorillonitic clays. These soils are typically clay in texture. They lack eluvial and illuvial horizons. They have moderate to strong granular structure in the upper horizons and have high coefficients of expansion and contraction upon wetting and drying. Calcium and magnesium in their exchange complex are dominant. With their high coefficients of expansion and contraction, these soils shrink and swell markedly with changes in moisture content. In the process of shrinking and swelling, the soils crack, and materials from upper horizons drop down into lower ones. Thus, the soils are being churned or mixed continually, a process that partially offsets horizon differentiation.

Grumusols may have prominent A_1 horizons but lack B horizons. They have dull colors of low chroma, as a rule, and are not well drained. Sharkey clay has many of the features common to Grumusols. The profile has a clay texture throughout, and the clay is dominantly montmorillonitic. The dark A_1 horizon, plus evidence of gleying in the deeper horizons, suggests placement of the series in the Humic Gley group. Laboratory analyses, however, indicate that the content of organic matter in the A_1 horizon of Sharkey clay is appreciably lower than that normal to Humic Gley soils and more nearly comparable to that of typical Grumusols. Furthermore, the dark A_1 horizon is also common to many Grumusols. Consequently, Sharkey clay is tentatively classified as a Grumusol, which intergrades to the Low-Humic Gley group. Sharkey clay seems more poorly drained than is typical of Grumusols, but it is not too wet for operation of the churning and mixing process.

Lack of distinct horizons in Sharkey clay is a reflection of the youth of the soils, the resistance of fine sediments to change, and some mixing of materials within the profile. The youth of the land surface and of the sediments in Bolivar County has been discussed earlier. The fine textures of soils such as Sharkey clay act as an effective brake on processes of horizon differentiation. Movements of constituents from one horizon to another are naturally slow in profiles with many very fine pores and few large ones. Rates of hydrolysis and breakdown of primary minerals are reduced because of the slow removal of the end products of these processes.

Mixing of materials from the present horizons is a further factor affecting horizon differentiation in Sharkey clay. Because of the montmorillonitic nature of the clay, the soil shrinks greatly when it becomes dry. Cracks that are from 1 to 4 inches wide form at the surface. These cracks extend downward for 2 or 3 feet, becoming narrower with depth. When the soil becomes wet again, it swells so that the cracks close, but seldom does that happen before some material from the A_1 horizon drops into the cracks and becomes mixed with the C or D horizon. The shrinking and swelling seem to be less than it is in the Grumusols (*5*) or the Regur soils of India (*7*), but the process is operating to some extent, the degree of which is as yet unknown. The mixing or churning of the soil seems to have partly offset horizon differentiation.

In Bolivar County the Grumusols great soil group includes only members of the Sharkey series. The A_1 horizon of these members is not evident in most places, largely because it has been obliterated by cultivation.

SHARKEY SERIES

The soils of the Sharkey series are poorly drained. They are dark-colored, uniformly heavy soils formed from fine-textured Mississippi River alluvium. They occur on slack-water flats. These soils are closely associated with the soils of the Alligator series but are darker gray. They are medium acid to neutral. In profile development the Sharkey soils grade toward soils of the Low-Humic Gley great soil group.

Overwash has been deposited on these soils in places. It consists of a layer, not more than 12 inches thick,

composed of silty clay loam or very fine sandy loam that overlies the Sharkey profile. Areas covered by this overwash are not extensive but are scattered throughout the outer fringes of the slack-water flats. Small balls and thin layers of Permian redbed material occur in these soils in a small area near Scott.

A profile of Sharkey clay, nearly level phase, follows:

A_{pg} 0 to 6 inches, very dark grayish-brown (10YR 3/2) firm clay; plastic when wet, and hard when dry; moderate fine granular structure.

C_g 6 to 48 inches, very dark gray (10YR 3/1) very firm clay mottled with brown and other shades of gray; very plastic when wet, and hard when dry; structureless (massive).

Alluvial soils

Alluvial soils are an azonal group of soils that developed from transported and recently deposited materials (alluvium). They are characterized by a weak modification (or none) of the original material by soil-forming processes (*9*).

Soils of this great soil group are described as lacking distinct horizons because the sediments in which they are developing are so young. Given more time under natural conditions, most of these soils would eventually have had profiles similar to those of the Bosket, Dubbs, and Dundee series. Whether that will now occur in soils under cultivation remains to be seen.

The regime in which these soils now exist differs greatly from that of their original natural environment. Some of the processes important in horizon differentiation probably will be accentuated and others subdued. Some may progress more rapidly and others more slowly. The net effect of the change in environment on future development of the soils cannot be forecast as yet with any certainty and may not be apparent for some centuries.

In Bolivar County the Alluvial great soil group includes members of the following series:

Clack.
Commerce.
Crevasse.
Robinsonville.
Tunica.

CLACK SERIES

The Clack series consists of excessively drained soils formed from coarse-textured Mississippi River alluvium. These soils occur on old natural levees that border former channels of the Mississippi River and small streams on the flood plain. They are closely associated with the Beulah, Bosket, Dubbs, and Dundee soils. They have formed from coarser textured sediments than the associated soils, and in contrast to those soils, they have little, if any, profile development. Except that the Clack soils are medium to strongly acid instead of neutral to alkaline, they closely resemble the Crevasse soils.

A profile of Clack loamy sand, nearly level phase, is as follows:

A 0 to 2 inches, very dark grayish-brown (10YR 3/2) loose loamy sand, stained with organic matter; structureless (single grain).

C_1 2 to 6 inches, grayish-brown (10YR 5/2) loose loamy sand stained slightly with organic matter; structureless (single grain).

C_2 6 to 14 inches, grayish-brown (10YR 5/2) loose loamy sand grading into light brownish-gray (10YR 6/2) loose loamy sand; structureless (single grain).

C_3 14 to 36 inches, grayish-brown (10YR 5/2) loose loamy sand; structureless (single grain).

COMMERCE SERIES

The soils of the Commerce series are moderately well drained to somewhat poorly drained. They have formed from fine textured to moderately coarse textured Mississippi River alluvium. They occupy small areas on recent natural levees that lie in narrow belts next to the river or next to abandoned cutoffs or channels. They are intermediate in drainage between the Mhoon and Robinsonville soils. Their reaction is neutral to alkaline. In profile development the Commerce soils grade toward soils of the Low-Humic Gley great soil group.

A profile of Commerce silt loam follows:

A_p 0 to 6 inches, grayish-brown (10YR 5/2) very friable silt loam; weak fine granular structure.

C_1 6 to 22 inches, light brownish-gray (10YR 6/2) to grayish-brown (10YR 5/2) friable silt loam faintly mottled with shades of yellow and brown; weak medium granular structure.

C_2 22 to 40 inches, light brownish-gray (10YR 6/2) friable silt loam mottled with shades of yellow and brown; structureless (massive).

CREVASSE SERIES

The Crevasse series consists of excessively drained soils formed from coarse-textured Mississippi River alluvium. These soils occur near the river or near recent channels or cutoffs. Like the Clack soils they are very sandy. They occur on recent natural levees, however, rather than on old natural levees, and are neutral to alkaline rather than medium to strongly acid. In addition to the typical Crevasse loamy sand mapped in this county, a shallow variant is mapped.

A profile of Crevasse loamy sand follows:

A_p 0 to 10 inches, yellowish-brown (10YR 5/4) very friable loamy sand; structureless (single grain).

C 10 to 42 inches, yellowish-brown (10YR 5/8 grading to 5/6) very friable loamy sand; structureless (single grain).

D 42 inches +, thick bed of coarse sand or loamy sand deposited by the Mississippi River.

A profile of Crevasse loamy sand, shallow variant, follows:

A_p 0 to 6 inches, grayish-brown (10YR 5/2) loose loamy sand stained with organic matter; contains many roots; in some places the upper 2 inches very dark grayish brown (10YR 3/2) and stained with organic matter.

C_1 6 to 9 inches, grayish-brown (10YR 5/2) loose loamy sand; some organic-matter stains and a few roots.

C_2 9 to 14 inches, light brownish-gray (10YR 6/2) loose loamy sand; some of the sand grains coated with organic matter.

C_3 14 to 25 inches, light-gray (10YR 7/2) loose loamy sand; specks of organic matter and a few roots.

D_1 25 to 30 inches, dark-gray (10YR 4/1) firm silty clay; yellowish-red (5YR 5/6) distinct medium mottles common; weak medium subangular blocky structure; a few roots; some sand.

D_2 30 to 36 inches, dark-gray (10YR 4/1) very firm clay; yellowish-red (5YR 4/6) distinct medium mottles common; weak medium subangular blocky structure; few roots; some sandy material in old root channels.

ROBINSONVILLE SERIES

Only one soil of the Robinsonville series, Robinsonville fine sandy loam, is mapped in this county. This soil has formed from moderately coarse textured and medium textured Mississippi River alluvium. It is on recent natural levees that occur in narrow belts next to the Mississippi River or along recent cutoffs or channels of

the river. This soil is well drained. It has better natural drainage than the Commerce and Mhoon soils, which also occur on recent natural levees. It is neutral to alkaline in reaction.

A profile of Robinsonville fine sandy loam follows:

A_p 0 to 8 inches, yellowish-brown (10YR 5/4) very friable fine sandy loam; weak fine granular structure.
C_1 8 to 14 inches, dark grayish-brown (10YR 4/2) very friable silt loam; structureless (massive).
D_1 14 to 36 inches, yellowish-brown (10YR 5/4) very friable fine sandy loam very faintly discolored; structureless (single grain).
D_2 36 to 40 inches, light yellowish-brown (10YR 6/4) very friable fine sandy loam; structureless (single grain).

TUNICA SERIES

The soils of the Tunica series are somewhat poorly drained. They have formed from fine textured to moderately fine textured Mississippi River alluvium. The soils resemble the Sharkey soils, with which they are closely associated. Unlike the Sharkey soils, they have developed from thin beds of clay that are underlain, at depths of 20 to 30 inches, by medium-textured to coarse-textured material. They also are better drained than the Sharkey soils. The Tunica soils occupy narrow areas throughout the slack-water flats. They are slightly acid to neutral in reaction.

A profile of Tunica silty clay, nearly level phase, follows:

A_p 0 to 4 inches, dark grayish-brown (10YR 4/2) firm silty clay; plastic when wet, and hard when dry; moderate medium granular structure.
C 4 to 18 inches, dark-gray (10YR 4/1) firm clay faintly mottled with brown and other shades of gray; very plastic when wet, and very hard when dry; weak medium subangular blocky structure.
D 18 to 30 inches, mottled gray and yellow friable silty clay loam; structureless (massive). This layer ranges from silty clay loam to silt loam and in places consists of interstratified thin beds of sand and clay.
D_2 30 inches+, silty or sandy friable alluvial material.

Glossary

Acidity. The degree of acidity of the soil expressed in pH values, or in words, as follows (*10*):

	pH
Extremely acid	below 4.5
Very strongly acid	4.5–5.0
Strongly acid	5.1–5.5
Medium acid	5.6–6.0
Slightly acid	6.1–6.5
Neutral	6.6–7.3
Mildly alkaline	7.4–7.8
Moderately alkaline	7.9–8.4
Strongly alkaline	8.5–9.0
Very strongly alkaline	9.1 and higher

Alluvium. Sand, silt, or clay deposited on land by streams.

Clay. The small mineral soil grains, less than 0.002 mm. (0.000079 in.) in diameter. (Formerly included the grains less than 0.005 mm. in diameter.)

Complex. A soil association composed of such an intimate mixture of areas of soil series, types, or phases that these cannot be indicated separately upon maps of the scale used and are therefore mapped as a unit.

Consistence. The attributes of soil material expressed by the degree of cohesion and adhesion or by resistance to forces tending to change the form or break the mass. The relative mutual attraction of the particles in the whole mass, or their resistance to separation. Terms used in the report to describe consistence are *firm, friable, hard, loose, plastic, slightly hard, very firm, very friable, very hard,* and *very plastic.*

Firm. Crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Friable. Crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.
Hard. Moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.
Loose. Noncoherent.
Plastic. Rolls into wirelike form; moderate pressure required to change form; puttylike.
Slightly hard. Weakly resistant to pressure; easily broken between thumb and forefinger.
Very firm. Crushes under strong pressure; barely crushable between thumb and forefinger.
Very friable. Crushes under very gentle pressure but coheres when pressed together.
Very hard. Very resistant to pressure; can be broken in the hands only with difficulty; not breakable between thumb and forefinger.
Very plastic. Rolls into wirelike form but much pressure required to change the form.

Contour tillage. Furrow plowed at right angles to the direction of slope, at the same level throughout, and ordinarily at comparatively close intervals.

Cropland. Land regularly used for crops, except forest crops. It includes rotation pasture, cultivated summer fallow, or other land ordinarily used for crops but temporarily idle.

Erosion, soil. The wearing away or removal of soil material by water or wind.

Family, soil. A taxonomic group of soils that have similar profiles and are composed of one or more distinct soil series. A category in soil classification between series and great soil groups.

Fertility, soil. The inherent qualities that enable a soil to sustain plant growth.

Forest. (1) Land not in farms that bears a stand of trees of any age or stature. These include seedlings (reproduction) but are of species that attain a minimum average height of 6 feet at maturity. (2) Land from which such a stand has been removed, but is not now restocking, and on which no other use has been substituted. Forest on farms is called farm woodland.

Genesis. Mode of origin of the soil, referring particularly to the processes responsible for the development of the solum (horizons A and B) from the unconsolidated parent material. (*See also* Horizon, soil.)

Granular. Roughly spherical aggregates that may be either hard or soft, usually more firm than crumb and without the distinct faces of blocky structure. (*See also* Structure, soil.)

Great soil group (soil classification). A broad group of soils having common internal soil characteristics.

Green-manure crop. Any crop grown and plowed under for the purpose of improving the soil, especially by the addition of organic matter.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, with characteristics produced by soil-forming processes.
Horizon A. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and that have lost clay minerals, iron, and aluminum with resultant concentration of the more resistant minerals; or (3) horizons belonging to both of these categories.
Horizon B. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, with accessory organic material; or (2) more or less blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizons or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly the lower limit of the B horizon corresponds with the lower limit of the solum.
Horizon C. A layer of unconsolidated material, little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a part of the overlying solum has developed.
Horizon D. Any stratum underlying the C, or the B if no C is present, that is unlike C, or unlike the material from which the solum has been formed.

Internal drainage. The movement of water through the soil profile. This rate is affected by the texture of the surface soil and subsoil, and by the height of the ground water table, either permanent or perched. Relative terms for expressing internal drainage are as follows: *Very rapid, rapid, medium, slow, very slow,* and *none.*

Leaching, soil. Removal of materials in solution.

Massive. (*See also* Structure, grade). Large uniform masses of cohesive soil, sometimes with ill-defined and irregular breakage, as in some of the fine-textured alluvial soils; structureless.

Morphology. The physical constitution of the soil expressed in the kinds of horizons; their thickness and arrangement in the profile; and the texture, structure, consistence, porosity, and color of each horizon.

Mottling, soil. Contrasting color patches that vary in number and size. Descriptive terms are as follows: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.* The size measurements are the following: *fine,* commonly less than 5 mm. [about 0.2 in.] in diameter along the greatest dimension; *medium,* commonly ranging between 5 and 10 mm. [about 0.2 to 0.6 in.] in diameter along the greatest dimension; and *coarse,* commonly more than 15 mm. [about 0.9 in.] in diameter along the greatest dimension (*6*).

Natural drainage. Refers to those conditions that existed during the development of the soil, as opposed to altered drainage. Drainage is altered by artificial means or by irrigation but may be altered by sudden deepening of channels or sudden blocking of drainage outlets. The following relative terms are used to express natural drainage: *Excessively drained, somewhat excessively drained, well drained, moderately well drained, imperfectly or somewhat poorly drained, poorly drained,* and *very poorly drained.*

Excessively drained. Water is removed from the soil very rapidly. Excessively drained soils commonly are shallow to bedrock and may be steep, very porous, or both. Enough precipitation commonly is lost from these soils to make them unsuitable for ordinary crop production.

Somewhat excessively drained. Water is removed from the soil rapidly so that only a small part is available to plants. Only a narrow range of crops can be grown on these soils, and yields are usually low without irrigation.

Well drained. Water is removed from the soil readily, but not rapidly. A well-drained soil has "good" drainage.

Moderately well drained. Water is removed from the soil somewhat slowly, so that the profile is wet for a small, but significant, part of the time.

Imperfectly or *somewhat poorly drained.* Water is removed from the soil slowly enough to keep it wet for significant periods, but not all of the time.

Poorly drained. Water is removed so slowly that the soil remains wet much of the time. The water table is commonly at or near the surface during a considerable part of the year.

Very poorly drained. Water is removed from the soil so slowly that the water table remains at or on the surface the greater part of the time.

Normal soil. A soil that has a profile in equilibrium or nearly in equilibrium with its environment. It has developed under good, but not excessive, drainage from parent material of mixed mineralogical, physical, and chemical composition, and it expresses the full effects of the forces of climate and living matter.

Nutrients, plant. The elements taken in by the plant that are essential to its growth. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps others obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The unconsolidated mass from which the soil profile develops. (*See also* C Horizon; Profile, soil; and Substratum.)

Permeability. That quality of the soil that enables it to transmit water or air.

Phase, soil. A subdivision of the soil type covering variations that are chiefly in such external characteristics as relief, stoniness, or accelerated erosion.

Productivity, soil. The capability of a soil to produce a specified plant (or plants) under a given system of management.

Profile, soil. A vertical section of the soil from the surface into the parent material.

Reaction. *See* Acidity.

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Small rock or mineral fragments with diameters ranging between 0.05 mm. (0.002 in.) and 2.0 mm. (0.078 in.). The term sand is also applied to soils containing 90 percent or more of sand.

Series, soil. A group of soils that have the same profile characteristics and the same general range in color, structure, consistence, and sequence of horizons; the same general conditions of relief and drainage; and usually a common or similar origin and mode of formation. A group of soil types closely similar in all respects except for the texture of the surface soil.

Silt. Small mineral soil grains ranging from 0.05 mm. (0. 002 in.) to 0.002 mm. (0.000079 in.) in diameter.

Single grain. Each grain taken alone, as in sand; structureless. (*See also* Structure, soil.)

Slope classes:

	Percent		*Percent*
Level	0–½	Gently sloping	3–7
Nearly level	½–3	Sloping	7–10

Soil. The natural medium for the growth of land plants on the surface of the earth; composed of organic and mineral materials.

Soil separates. The individual size-groups of mineral particles.

Solum. The genetic soil developed by soil-building forces. In normal soils, the solum includes the A and B horizons, or the upper part of the soil profile above the parent material.

Structure, soil. The arrangement of the individual grains and aggregates that make up the soil mass; may refer to the natural arrangement of the soil when in place and undisturbed or to the soil at any degree of disturbance. Soil structure is classified according to *grade, class,* and *type* or *subtype.*

Grade. Degree of distinctness of aggregation and expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: *structureless* (*single grain* or *massive*), *weak, moderate,* and *strong.*

Class. Size of soil aggregates. Terms: *Very fine* or *very thin, fine* or *thin, medium, coarse* or *thick,* and *very coarse* or *very thick.*

Type. Shapes for soil aggregates. Terms for type: *Platy, prismatic, columnar, blocky, subangular blocky, granular* (*nonporous*), and *crumb* (*very porous*). Example of soil-structure grade, class, and type: Moderate coarse blocky. Principal structural types in this county are blocky, subangular blocky, and granular. Fine blocky structure peds (aggregates or units) are 5 to 10 mm. (0.2 to 0.4 inch) in size; medium blocky or subangular blocky, 10 to 20 mm (0.4 to 0.8 inch); and coarse subangular blocky, 20 to 50 mm. (0.8 to 2.0 inches). Fine granular structure peds are 1 to 2 mm. (0.04 to 0.08 inch) in size and medium granular structure peds are 2 to 5 mm. (0.08 to 0.2 inch) in size (*10*).

Structureless. That condition in which there is no observable aggregation or no definite orderly arrangement of natural lines of weakness. *Massive* if coherent; *single grain* if noncoherent.

Subsoil. Technically, the B horizon; roughly, that part of the profile below plow depth.

Substratum. Material underlying the subsoil. (*See also* Horizon, soil.)

Surface runoff. Refers to the amount of water removed by flow over the surface of the soil. The amount and rapidity of surface runoff are affected by factors such as texture, structure, and porosity of the surface soil; the plant cover; the prevailing climate; and the slope. The degree of surface runoff is expressed by the terms *very rapid, rapid, medium, slow, very slow,* and *ponded.*

Surface soil. Technically, the A horizon; commonly, the part of the upper profile usually stirred by plowing.

Texture. Size of individual particles making up the soil mass. The various soil separates, as sand, silt, and clay determine texture. A coarse-textured soil is one high in sand; a fine-textured soil has a large proportion of clay.

Type, soil. A group of soils having genetic horizons similar as to the differentiating characteristics, including texture and arrangement in the soil profile, and developed from a particular type of parent material.

Workability. The ease with which tillage, harvesting, and other farming operations can be accomplished.

Literature Cited

(1) ARNOLD, J. R., and LIBBY, W. F.
1951. RADIOCARBON DATES. Science 113: 111–120.

(2) FENNEMAN, N. M.
1938. PHYSIOGRAPHY OF EASTERN UNITED STATES. 714 pp., illus. New York and London.

(3) MARBUT, C. F.
1935. SOILS OF THE UNITED STATES. *In* U. S. Dept. Agr. Atlas of Amer. Agr., pt. 3, Advance Sheets 8, 98 pp., illus.

(4) MISSISSIPPI HISTORICAL RECORDS.
1941. INVENTORY OF THE COUNTY ARCHIVES OF MISSISSIPPI, TUNICA COUNTY, MISS. 72: 81–94.

(5) OAKES, H., and THORP, J.
1951. DARK CLAY SOILS OF WARM REGIONS, VARIOUSLY CALLED RENDZINA, BLACK COTTON SOIL, REGUR, AND TIRS. Soil Sci. Soc. Amer. Proc. (1950) 15: 348–354.

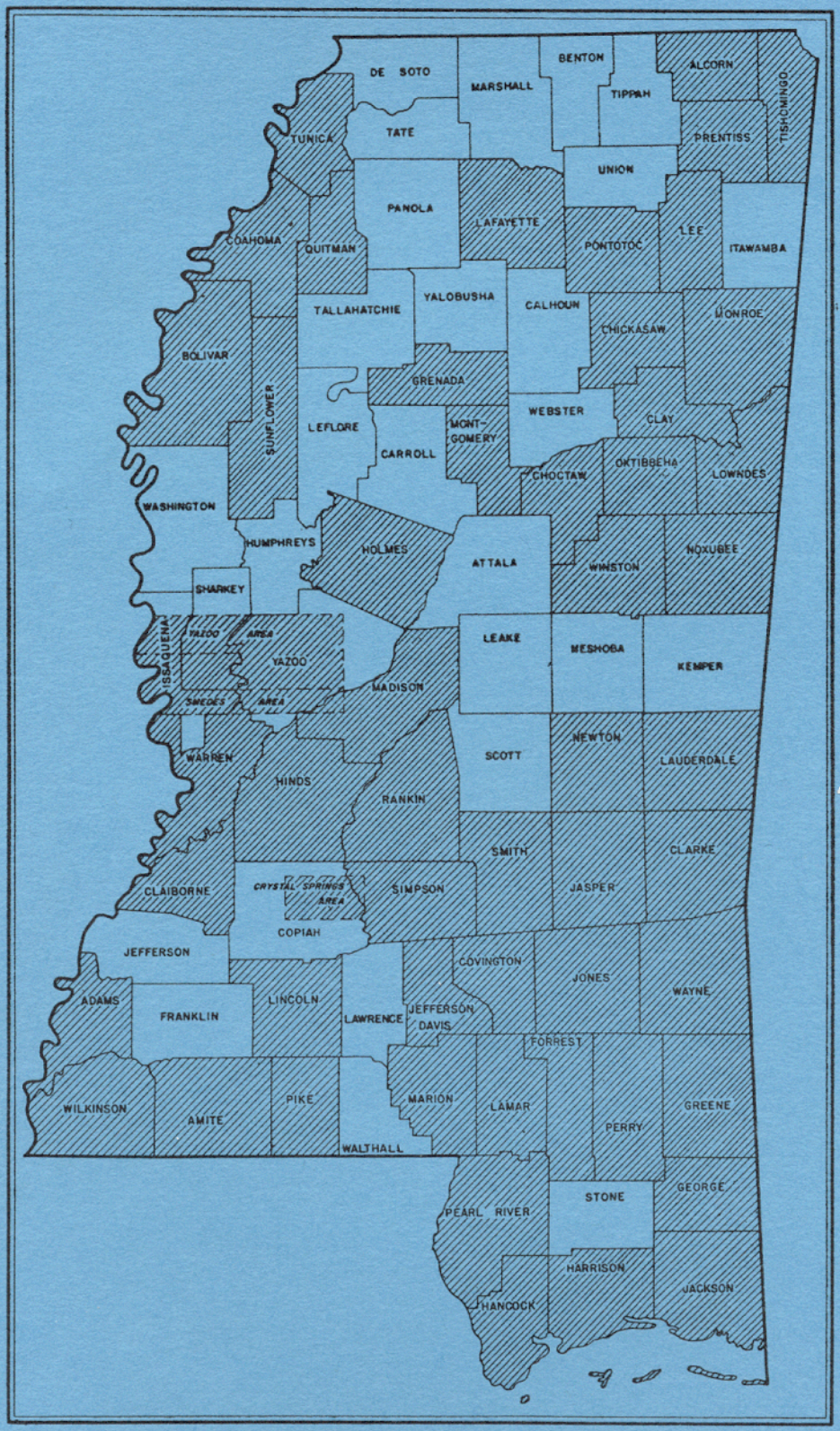
(6) SIMONSON, R. W.
1951. DESCRIPTION OF MOTTLING IN SOILS. Soil Sci. 71: 187–192, illus.

(7) ———
1954. MORPHOLOGY AND CLASSIFICATION OF THE REGUR SOILS OF INDIA. Jour. of Soil Sci. 5: 275–288.

(8) THORP, J., and SMITH, G. D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126, illus.

(9) UNITED STATES DEPARTMENT of AGRICULTURE.
1938. SOILS AND MEN. U. S. Dept. Agr. Yearbook 1938, 1232 pp., illus.

(10) ———
1951. SOIL SURVEY MANUAL. U. S. Dept. Agr. Handbook 18, 503 pp., illus. [Replaces U. S. Dept. Agr. Misc. Pub. 274, the *Soil Survey Manual* published 1937.]



Areas surveyed in Mississippi shown by shading.